



U.S. DEPARTMENT OF
ENERGY

DOE Federal Grants Workshop

Hosted by U.S. Senator John Ensign
University of Nevada, Reno

James Spaeth

Office of Energy Efficiency and Renewable Energy (EERE)
Director, Office of Commercialization and Project Management

DOE Golden Field Office

April 14, 2009



Agenda



- Administration Objectives
- American Recovery and Reinvestment Act and FY09 Annual Appropriations
- DOE EERE Overview
- EERE Programs
- Tax Credits
- Loan Guarantee Program
- Grants - Basics
- Resources
- Points of Contact

New Administration Clean Energy Goals



“Double energy from clean, renewable sources like wind power or solar power and 60 billion gallons of advanced biofuels.”

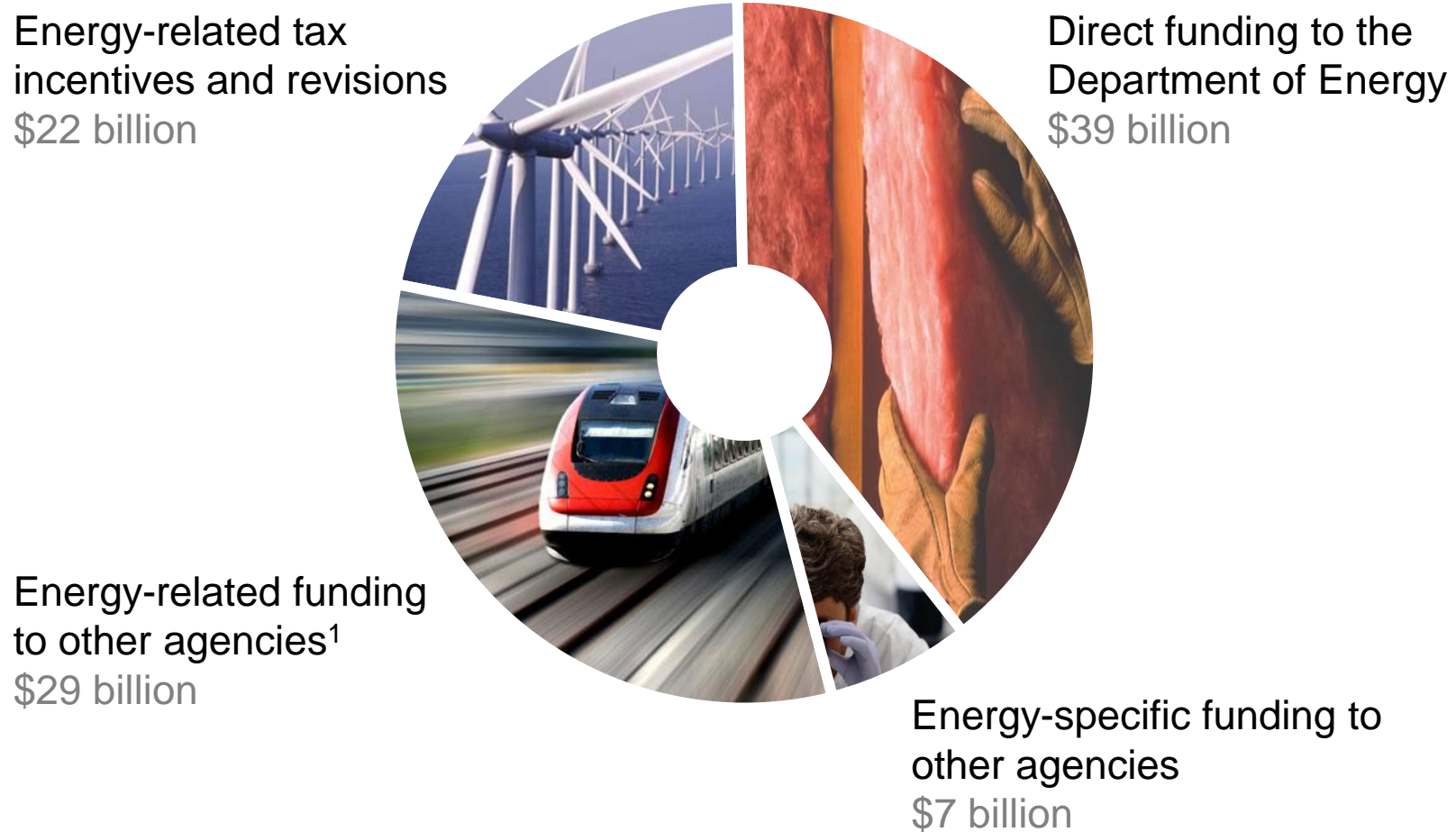
“Help create five million new jobs by strategically investing \$150 billion over the next ten years to catalyze private efforts to build a clean energy future.”

“Put 1 million Plug-In Hybrid cars -- cars that can get up to 150 miles per gallon -- on the road by 2015, cars that we will work to make sure are built here in America.”

“Implement a market-based cap-and-trade program to reduce greenhouse gas emissions 80 percent by 2050.”



Energy-related provisions in the Recovery Act drive total authorization for clean, smart, and efficient energy to ~\$100B



¹ Projects where objective includes but is not limited to energy-efficiency or renewable energy goals

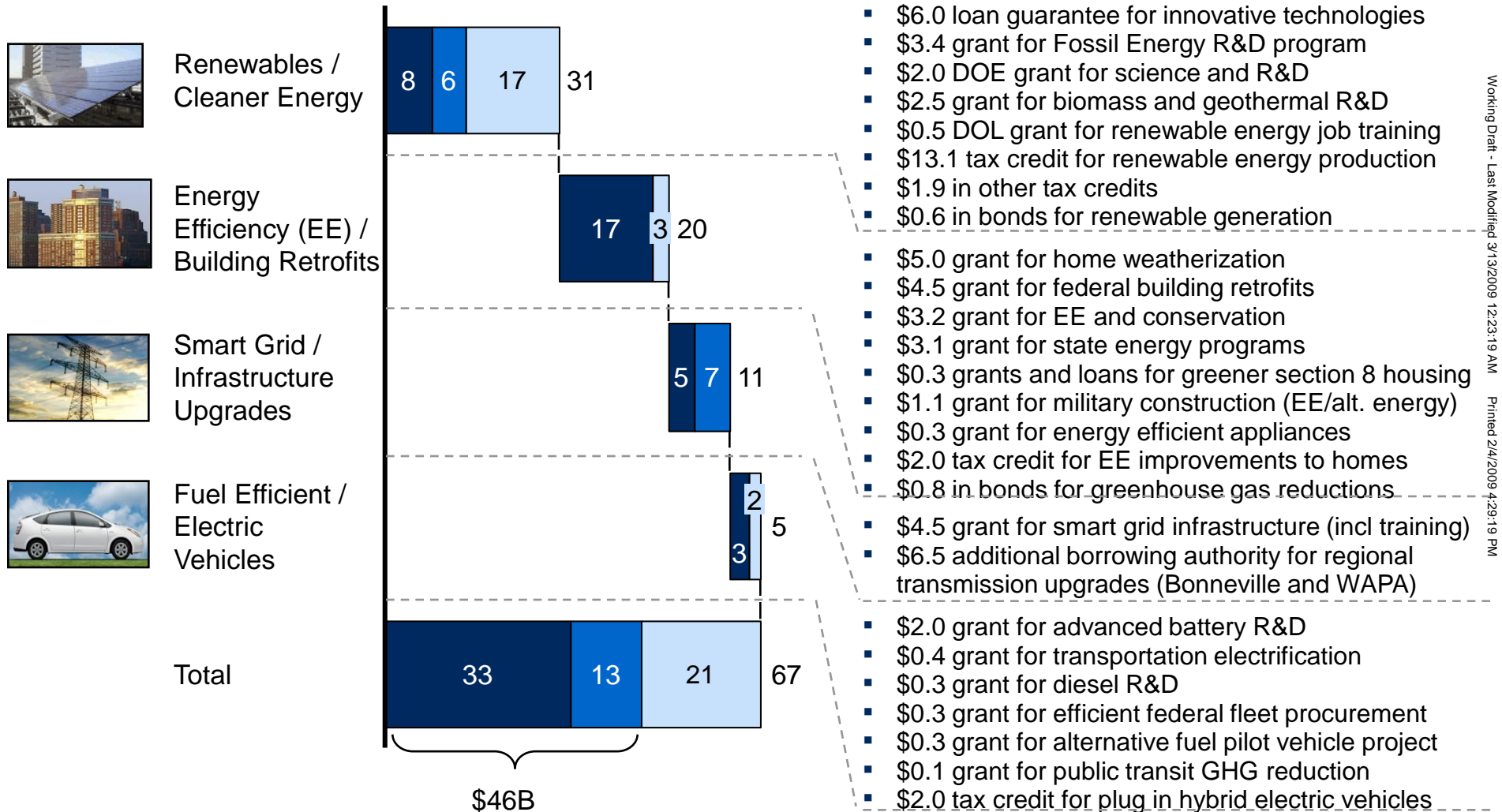
The Recovery Act includes \$67B for energy-focused initiatives PRELIMINARY

Tax Credit
 Loan Guarantee
 Grant/Direct Spend

\$ Billions

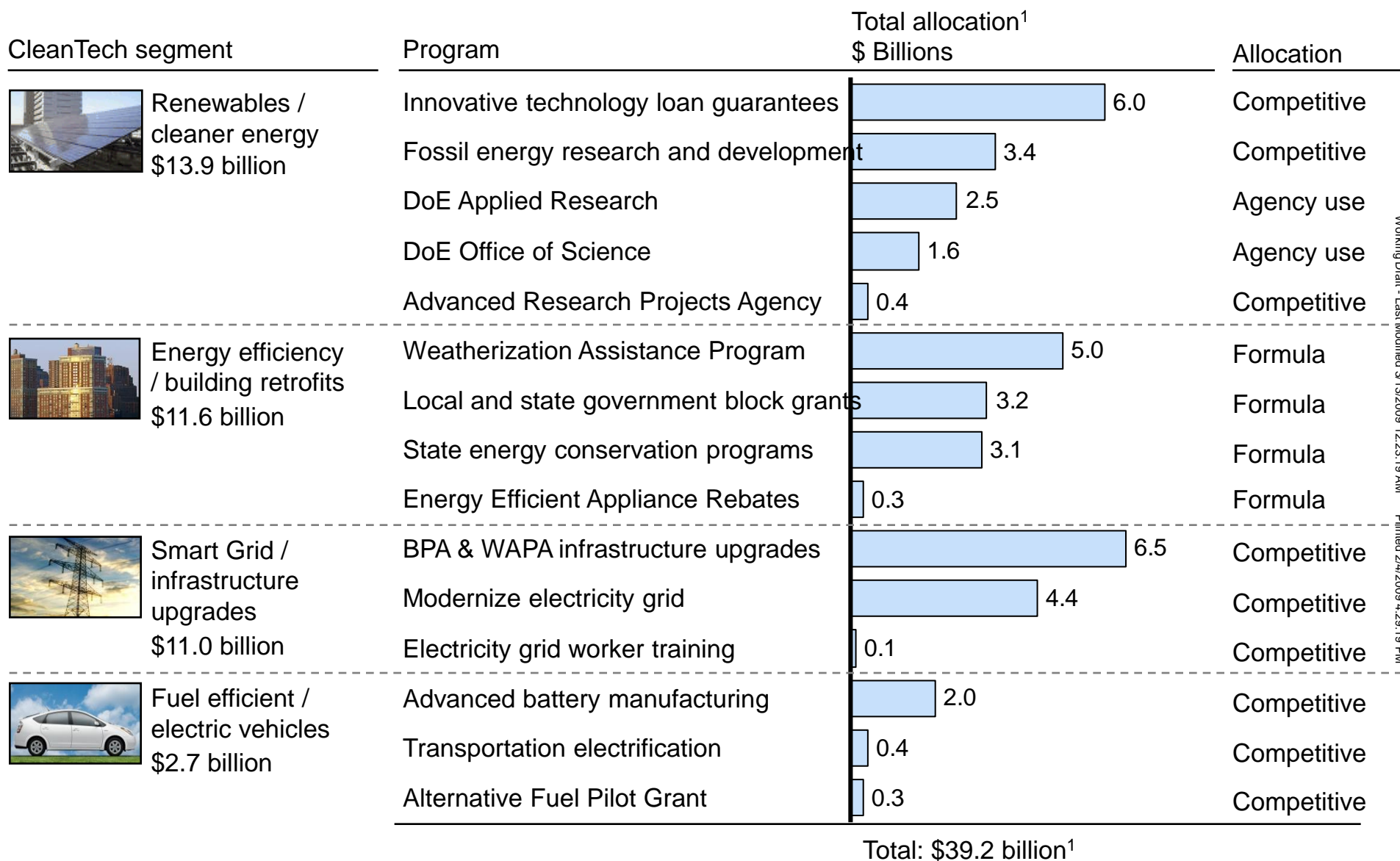
CleanTech focused investments¹

Description



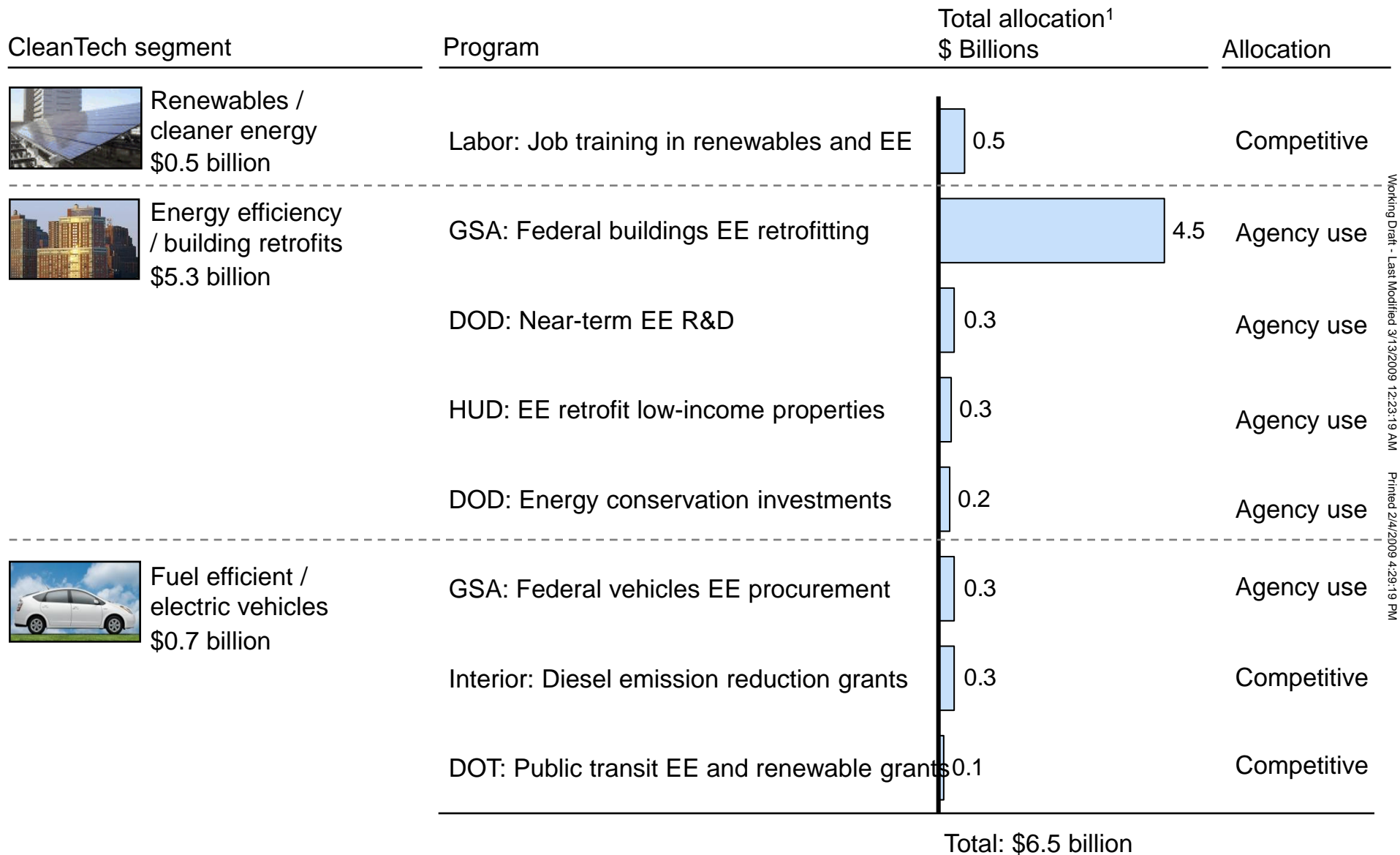
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\$39B direct funding for the Department of Energy (DOE)



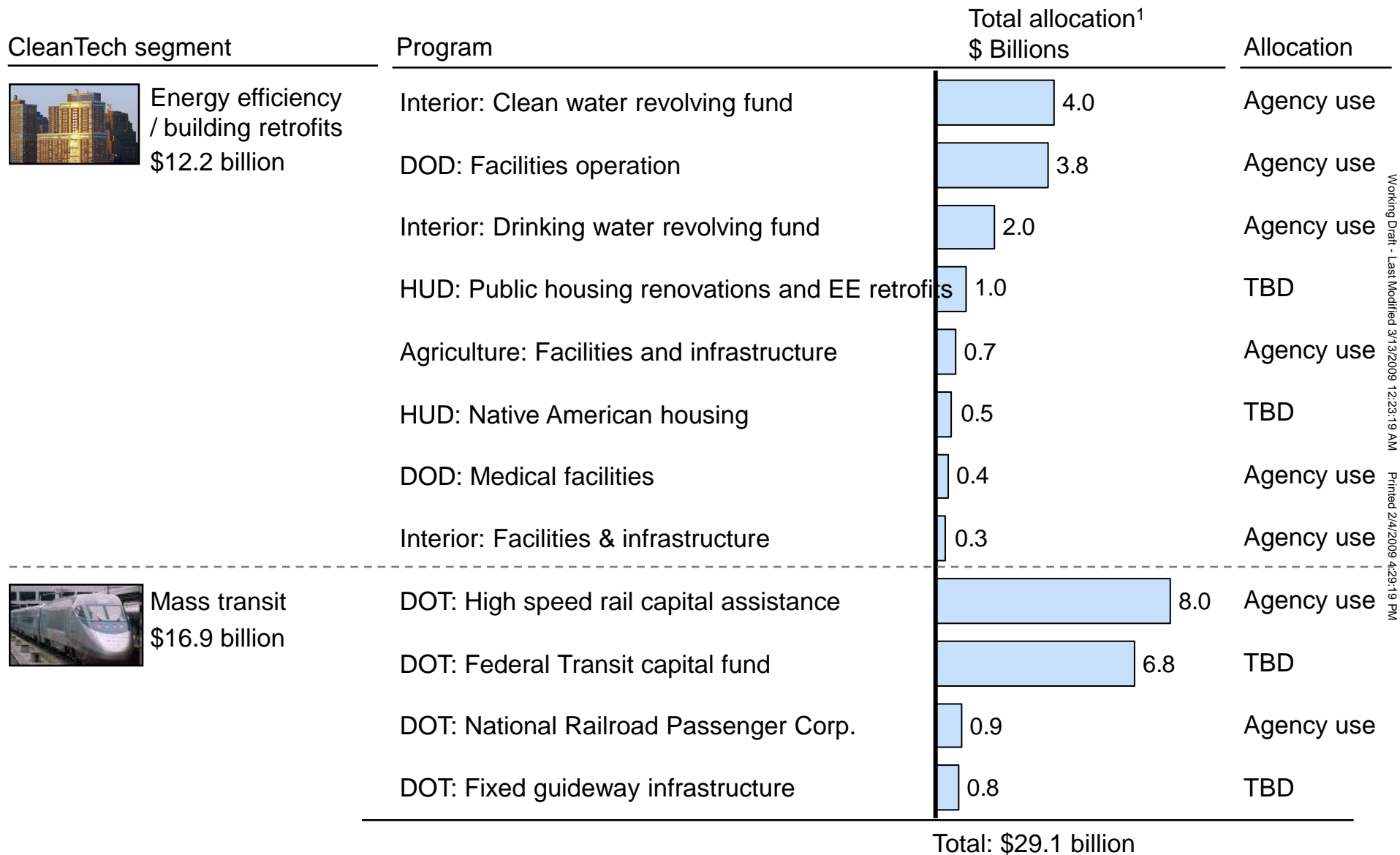
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\$7B energy-specific funding to other agencies



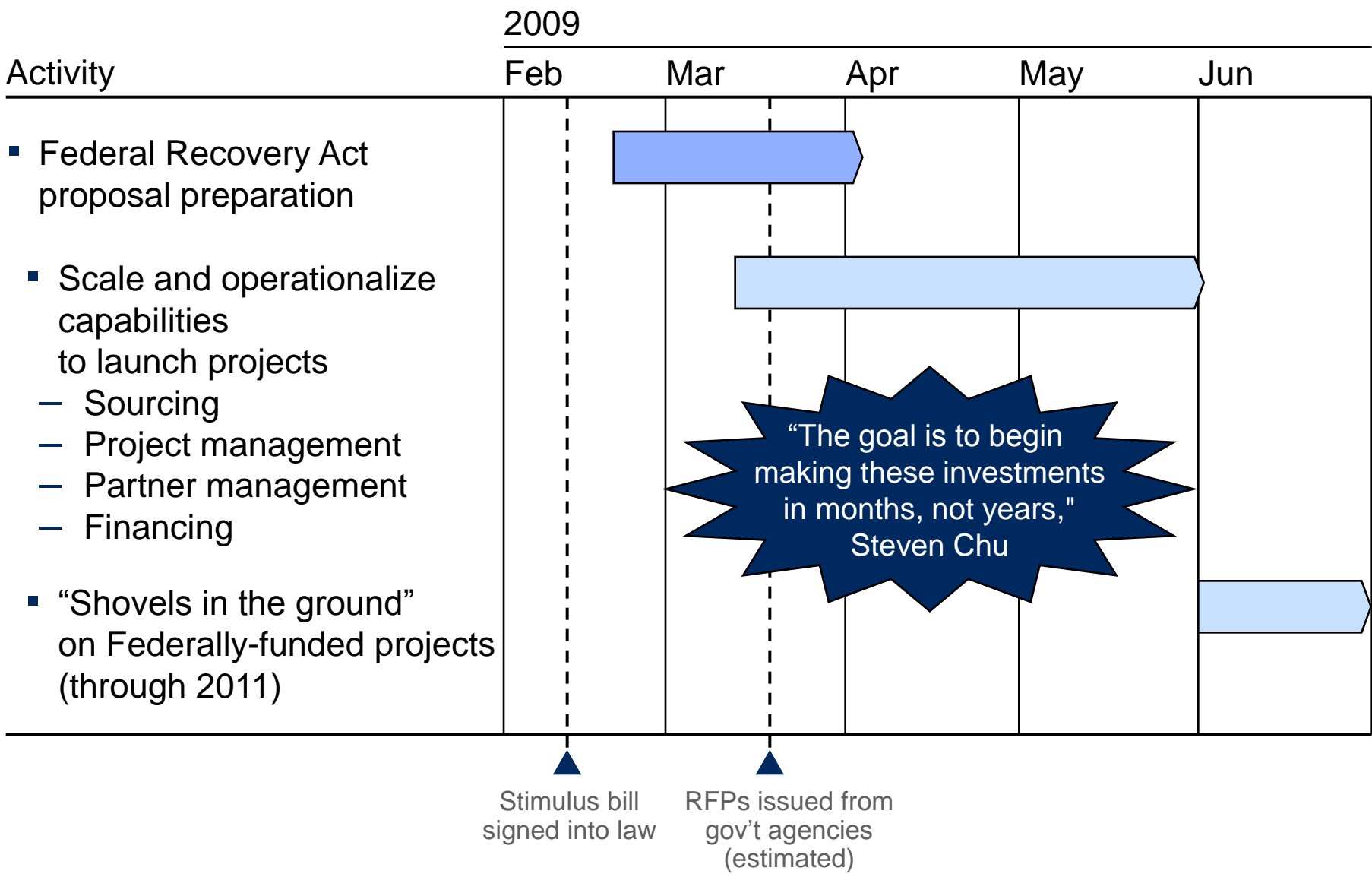
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\$29B partially energy-related funding to other agencies



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Recovery Act will be followed quickly by action to create jobs and stimulate investment



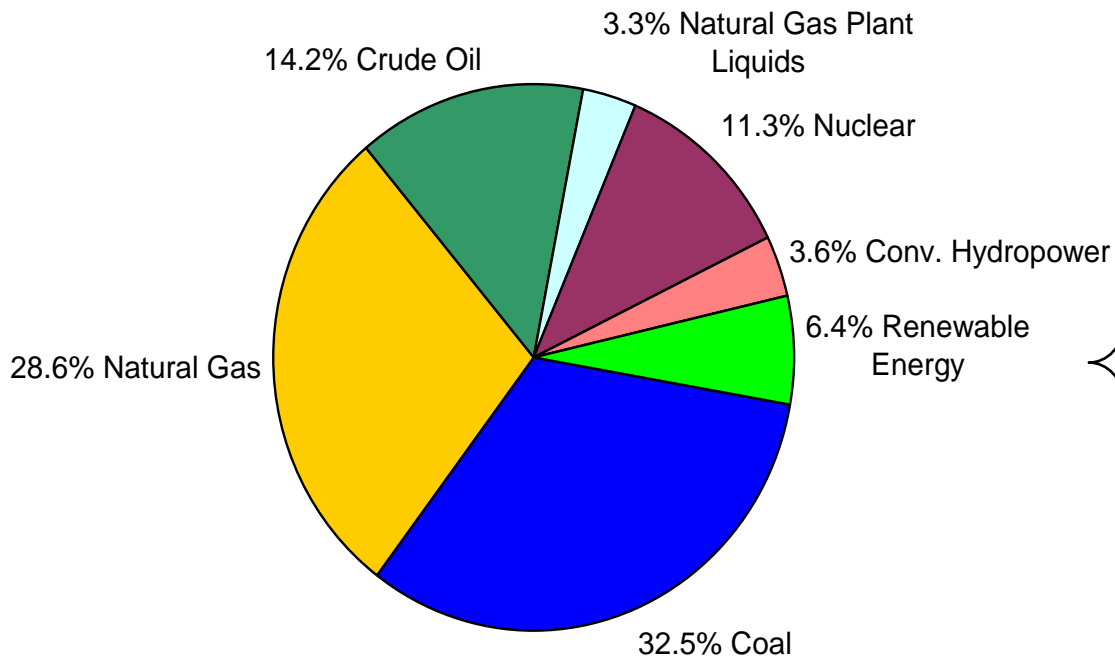
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U.S. Renewable Energy Production

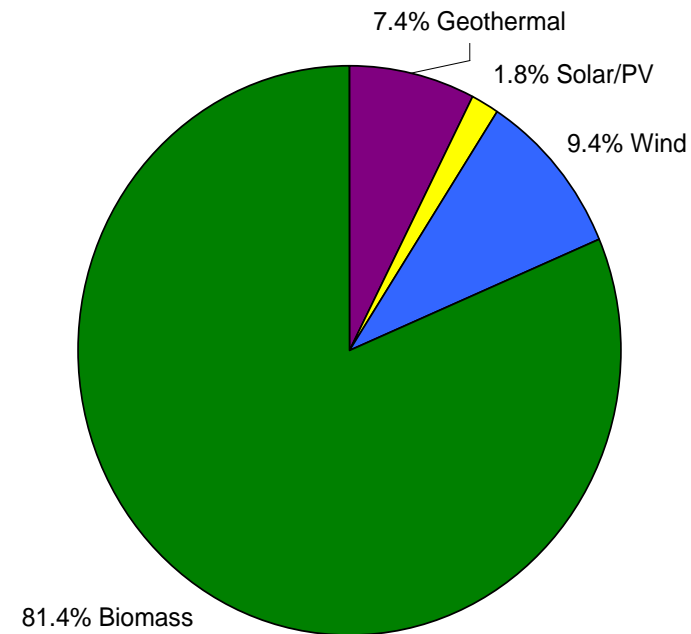


U.S. Energy Production (2008*) with Renewable Energy Break Down

U.S. Energy Production (2008*)



U.S. Renewable Energy Production (2008*):
6.4% of Total U.S. Energy Production



*2008 Figures are 11-Month Totals

Source: EIA

EERE is dedicated to accelerating market penetration of America's abundant, secure, affordable and clean renewable energy and energy efficiency technologies



Power Generation

- Geothermal
- Wind
- Solar
- Water Power

Fuels & Vehicles

- Biomass/Biofuels
- Hydrogen
- Vehicle Technologies

Energy Efficiency

- Buildings Technologies
- Industrial Technologies
- Weatherization
- Federal Energy Management



American Recovery and Reinvestment Act of 2009



Over \$40 billion of the \$787 billion recovery plan is allocated for clean energy

Investment focus:

\$16.8 billion for EERE

\$14.0 billion for electric power transmission grid infrastructure, storage and deployment
- incl. \$6 billion for loan guarantees

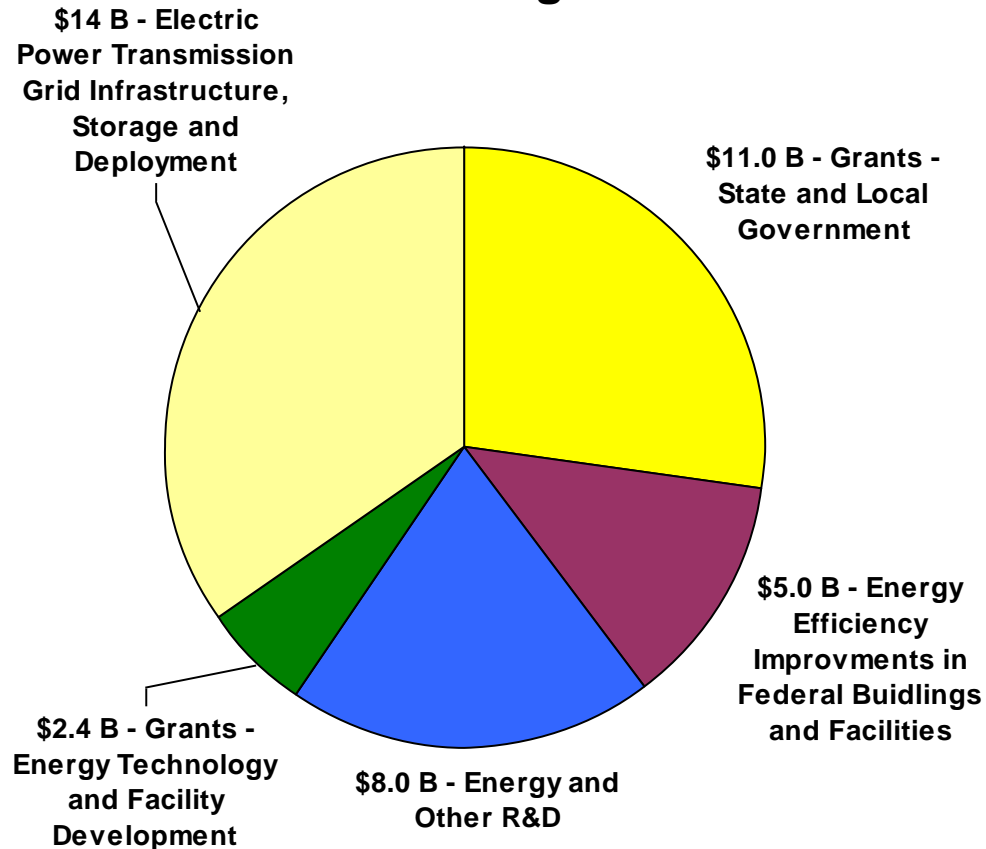
\$9.6 billion for other energy programs

Expanding workforce training

Promoting Mass Transit Systems

New and modified clean energy tax incentives are estimated at \$20+ billion

Breakdown of Clean Energy Funding



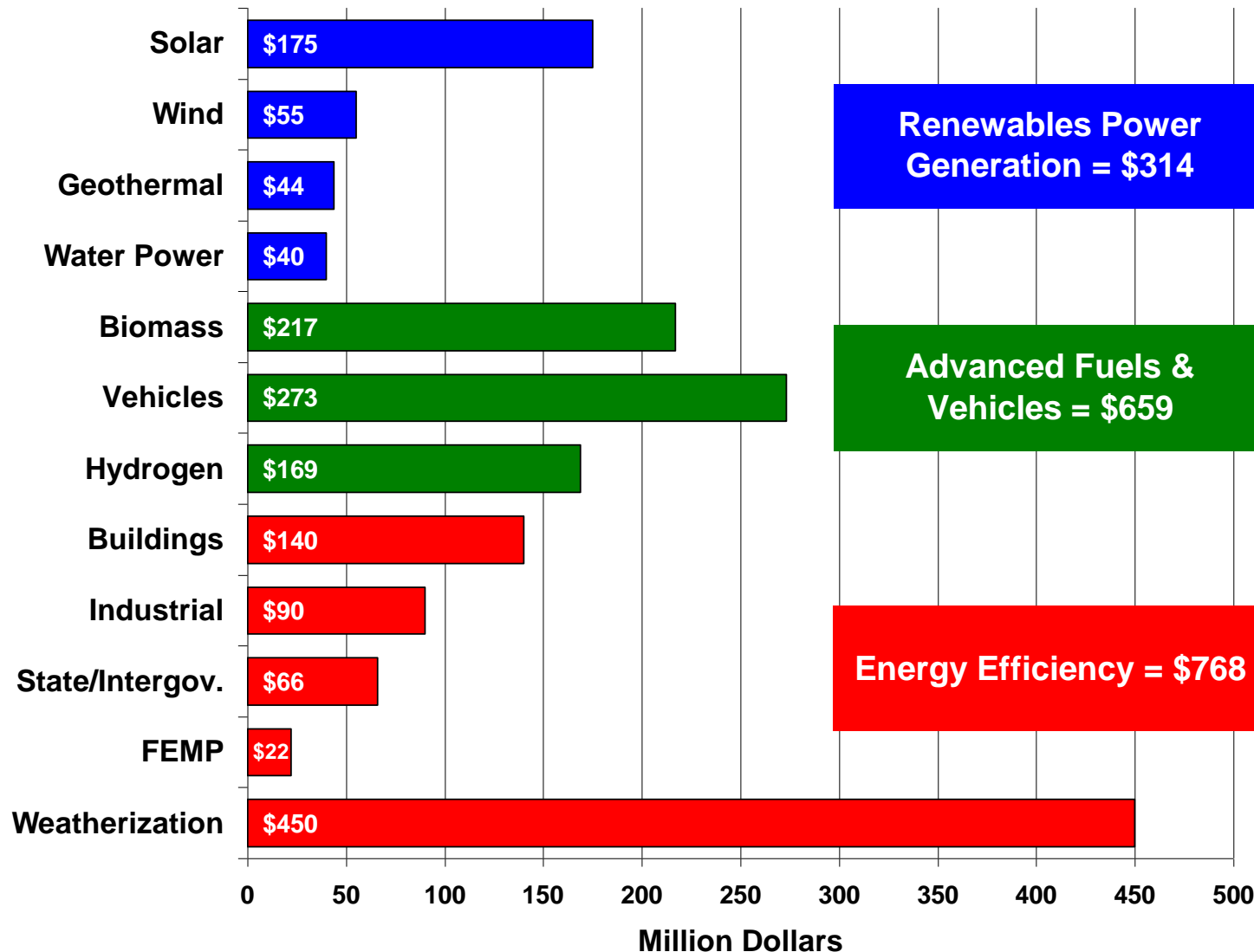
Funds are supplemental to annual appropriations

EERE Recovery Act Funding: Approval still needed for \$3.1 billion



Office of Energy Efficiency & Renewable Energy	Recovery Act (\$ Millions)
EERE Directed Funding	\$14,300
Energy Efficiency & Conservation Block Grants	\$3,200
State Energy Program	\$3,100
Weatherization Assistance Program	\$5,000
Energy Star Rebates	\$300
Transportation Electrification	\$400
Clean Cities Alternative Fuels Pilot Program	\$300
Advanced Battery & Hybrid Components Manufacturing	\$2,000
EERE Discretionary RD&D	\$2,500
Technology RD&D	\$1,300
Biomass	\$800
Geothermal Technologies	\$400
EERE Subtotal	\$16,800

Fiscal Year 2009 Budget - \$2,179 Million



Note: Bar chart does not include Facilities and Infrastructure (\$76), Program Direction (\$128), Program Support (\$18) and Congressionally Directed (\$229)

EERE - FY 2008 and FY 2009 Budgets



	Funding (\$ in thousands)			
Energy Efficiency and Renewable Energy	FY 2008	FY 2009	Change	% Change
Programs:	Appropriation	Appropriation	FY08 to FY09	
Biomass and Biorefinery Systems R&D	195,633	217,000	+21,367	11%
Building Technologies	107,382	140,000	+32,618	30%
Federal Energy Management Program	19,818	22,000	+2,182	11%
Geothermal Technology	19,307	44,000	+24,693	128%
Hydrogen Technology	206,241	168,960	-37,281	-18%
Industrial Technologies	63,192	90,000	+26,808	42%
Solar Energy	166,230	175,000	+8,770	5%
Vehicle Technologies	208,359	273,238	+64,879	31%
Water Power	9,654	40,000	+30,346	314%
Wind Energy	49,034	55,000	+5,966	12%
Weatherization and Intergovernmental Activities	282,217	516,000	+233,783	83%
Facilities and Infrastructure	76,176	76,000	-176	0%
Program Direction	104,057	127,620	+23,563	23%
Program Support	10,801	18,157	+7,356	68%
Congressionally-Directed Activities	186,664	228,803	+42,139	23%
Adjustments	-743	-13,238		
Total, Energy Efficiency and Renewable Energy	1,704,022	2,178,540	+474,518	27.8%

EERE Programs to Review



- Intergovernmental Programs
 - State Energy Program
 - Weatherization
 - Energy Efficiency and Conservation Block Grants
- Biomass
- Geothermal
- Hydrogen
- Industrial Energy Efficiency
- Solar
- Tribal
- Vehicles and Advanced Batteries
- Water and Hydropower
- Wind
- Commercialization and Deployment Activities

State Energy Program (SEP)



- SEP provides federal financial assistance, on a cost-shared basis, and technical support to States and Territories to strengthen their capabilities to develop and deploy energy efficiency technologies and accelerate market penetration tailored to meet their unique energy needs.
 - SEP is EERE's ONLY program that targets all market sectors and technologies



- **SEP** funding level: \$25 million
- **ARRA** funding level: 3.1 billion to be distributed to the states by formula:
 - 1/3 equal share to all states
 - 1/3 according to most recent population data
 - 1/3 according to most recent energy use data
 - No match requirement and 50% limit on capital expenditure waived for AARA funding
- Nevada Allocations
 - SEP -- \$ 192,000
 - ARRA -- \$ 34,714,000
- Full Applications Due –May 12, 2009

SEP & ARRA Use of Funds



- DOE encourages States to choose activities that will provide sustained benefits to their citizens – activities that will transform markets and have broad and lasting impacts on energy use within their borders
 - Examples would be revolving loans, on-bill financing strategies and performance contracting
 - Other high impact areas:
 - Establishment and enforcement of energy efficient building codes and standards and implementation of voluntary programs that impact new design
 - Loans, grants and incentives for energy efficiency and renewable energy measures
 - Building retrofits
 - Traffic signal synchronization and replacement with LEDs
 - Industrial retrofits

SEP and ARRA -- Use of Funds



- The results achieved will be assessed according to the following performance metrics:
 - Jobs created
 - Energy (kwh/therms/gallons/BTUs, etc) saved
 - Renewable energy installed capacity and generated
 - GHG emissions reduced (CO2 equivalents)
 - Energy cost savings
 - Funds leveraged

Weatherization Assistance Program (WAP)

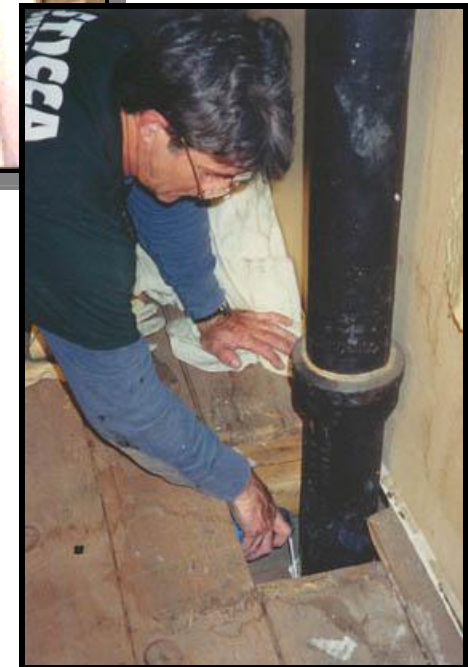


- Purpose
 - Increase the energy efficiency of dwellings owned or occupied by low-income persons, reduce their total residential expenditures, and improve their health and safety, especially low-income persons who are particularly vulnerable such as elderly, persons with disabilities, families with children, high residential energy users, and households with high energy burden





This is what we find



This is what WAP does



WAP FY 2009 DOE Funding



- \$ 1,036,451 Supplemental
- \$ 1,511,274 Regular Omnibus
- \$ 37,281,937 American Recovery & Reinvestment Act
 - ARRA funds will weatherize an additional 5,000 homes

Status

- Funding for WAP funds released
- Nevada WAP ARRA awarded 04/01/09
- Nevada regular program year begins July 1
- Current contractors are in the process of hiring and training new staff. Additional contractors may be added

New WAP Requirements

- Average cost per home increased to \$6,500
- Income eligibility increased to 200% of poverty
- Prevailing wage requirements

Local WAP Agencies



- All services provided by private contractors

- HELP of Southern Nevada (Las Vegas) serves Clark County except City of Henderson
- Neighborhood Services serves City of Henderson
- Rural Nevada Development Corp. (Ely) serve White Pine, Humboldt, Pershing, Eureka, Mineral, Nye, Lander, Lincoln, Elko, and Churchill counties
- Nevada Rural Housing Authority (Carson City) serves Carson City, Washoe, Lyon, Storey, and Douglas counties

Energy Efficiency and Conservation Block Grant Program (EECBG)



- Purpose
 - Provide grants to U.S. local governments, states, territories, and Indian tribes, to fund projects that reduce energy use and fossil fuel emissions, and that improve in energy efficiency.



EECBG - Available Funding



- \$3.2 billion for the EECBG Program
 - Nearly \$2.7 billion will be distributed through formula grants
 - Balance of \$455 million through competitive grants
- Allocations to entities eligible for direct formula grants from the DOE are based on the following approximate funding amounts:
 - Nearly \$1.9 billion is available to cities and counties
 - More than \$770 million is available to states, U.S. territories, and the District of Columbia
 - Nearly \$54 million is available to Indian tribes
- In addition, each state must pass not less than 60% of its allocation on to cities and counties within the state that are ineligible for direct formula grants from the DOE
- Each state decides how to award these sub-grants
- Application Due Dates
 - States – May 26, 2009
 - Localities – June 25, 2009

EECBG - Allowable Activities



- Energy Efficiency and Conservation Strategy and Technical Consultant Services to assist in the development of such a strategy.
- Residential and Commercial Building Energy Audits.
- Financial Incentive Programs and Mechanisms for energy efficiency improvements such as energy savings performance contracting, on-bill financing, and revolving loan funds.
- Grants to nonprofit organizations and governmental agencies for the purpose of performing Energy Efficiency Retrofits.
- Energy Efficiency and Conservation Programs for Buildings and Facilities.
- Development and Implementation of Transportation Programs to conserve energy.
- Building Codes and Inspections to promote building energy efficiency.
- Energy Distribution Technologies that significantly increase energy efficiency, including distributed resources, combined heat and power, and district heating and cooling systems.
- Material Conservation Programs including source reduction, recycling, and recycled content procurement programs that lead to increases in energy efficiency.
- Reduction and Capture of Methane and Greenhouse Gases generated by landfills or similar waste-related sources.
- Energy efficient Traffic Signals and Street Lighting.
- Renewable Energy Technologies on Government Buildings.
- Any Other Appropriate Activity that meets the purposes of the program and is approved by DOE

EECBG – Nevada Eligible Communities



State	Name	Government Level	Allocation
NV	Nevada	State Energy Office	\$9,593,500
NV	Boulder City	City	\$61,600
NV	Carson	City	\$538,900
NV	Elko	City	\$76,500
NV	Fernley	City	\$52,000
NV	Henderson	City	\$2,237,000
NV	Las Vegas	City	\$5,449,200
NV	Mesquite	City	\$69,900
NV	North Las Vegas	City	\$1,907,400
NV	Reno	City	\$2,142,800
NV	Sparks	City	\$840,000
NV	Churchill	County	\$104,900
NV	Clark	County	\$7,663,500
NV	Douglas	County	\$195,000
NV	Elko	County	\$123,600
NV	Humboldt	County	\$75,600
NV	Lyon	County	\$165,200
NV	Nye	County	\$185,700
NV	Pershing	County	\$50,000
NV	Washoe	County	\$401,200
NV	White Pine	County	\$50,000

EECBG - Tribal Allocations



- CA/NV Washoe Tribe of Nevada & California (Carson Colony, Dresslerville Colony, Woodfords Community, Stewart Community, & Washoe Ranches) \$ 111,800
- CA/NV Fort Mojave Indian Tribe of Arizona, California and Nevada \$ 32,200
- NV Pyramid Lake Paiute Tribe of the Pyramid Lake Reservation, Nevada \$ 58,400
- NV Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada \$ 47,400
- NV Reno-Sparks Indian Colony, Nevada \$ 44,400
- NV Te-Moak Tribe of Western Shoshone Indians of Nevada (Four constituent bands:
 - Battle Mountain Band; Elko Band; South Fork Band and Wells Band) \$ 44,300
- NV Paiute-Shoshone Tribe of the Fallon Reservation and Colony, Nevada \$ 38,000
- NV Walker River Paiute Tribe of the Walker River Reservation, Nevada \$ 36,800
- NV Yerington Paiute Tribe of the Yerington Colony & Campbell Ranch, Nevada \$ 26,200
- NV Duckwater Shoshone Tribe of the Duckwater Reservation, Nevada \$ 25,000
- NV Ely Shoshone Tribe of Nevada \$ 25,000
- NV Las Vegas Tribe of Paiute Indians of the Las Vegas Indian Colony, Nevada \$ 25,000
- NV Lovelock Paiute Tribe of the Lovelock Indian Colony, Nevada \$ 25,000
- NV Moapa Band of Paiute Indians of the Moapa River Indian Reservation, Nevada \$ 25,000
- NV Summit Lake Paiute Tribe of Nevada \$ 25,000
- NV Winnemucca Indian Colony of Nevada \$ 25,000
- NV Yomba Shoshone Tribe of the Yomba Reservation, Nevada \$ 25,000
- NV/OR Fort McDermitt Paiute and Shoshone Tribes of the Fort McDermitt Indian Reservation, Nevada and Oregon \$ 25,800
- NV/UT Confederated Tribes of the Goshute Reservation, Nevada and Utah \$ 25,000

Biomass Program Overview



Mission Statement

Develop and transform our renewable and abundant biomass resources into cost competitive, high performance biofuels, bioproducts, and biopower. This will be achieved through targeted research, development, and demonstrations leading to deployment in integrated biorefineries, supported through public and private partnerships.

Program's Goals

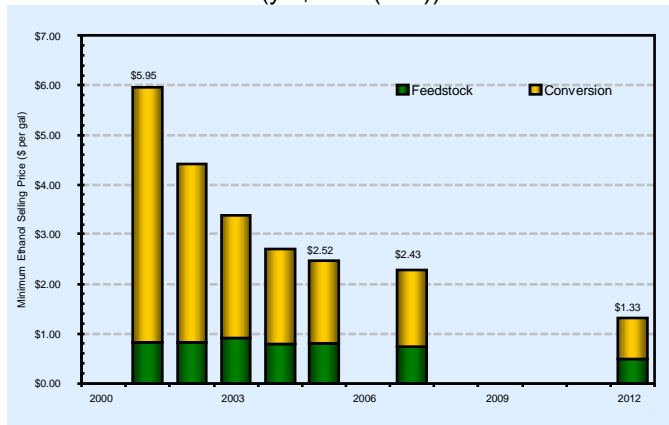
- Short Term: Foster breakthrough technologies needed to make cellulosic ethanol cost competitive by 2012 (cost target: \$1.33/gal).
- Mid Term: Help create an environment conducive to maximizing the sustainable production of biofuels by 2017, including cost-effective technology, sufficient infrastructure, appropriate policies, and supportive consumers (cost target: \$1.20/gal).
- Long Term: Increase the supply of renewable fuels to 36 billion gallons by 2022 - especially contributing to the 21 billion gallons of cellulosic and advanced biofuels (EISA, RFS)

The Industry Landscape

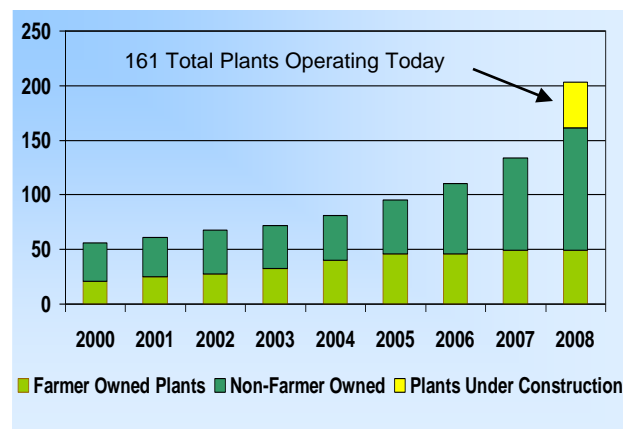


- The growth in the existing ethanol and biofuels industry has been over 50% per year
- Current corn ethanol capacity and including plants under construction will easily meet the EISA corn ethanol cap
- The combination of cellulosic biofuels cost reduction and current demonstration projects are poised to spur investment in advanced biofuels helping to achieve the RFS objectives of EISA

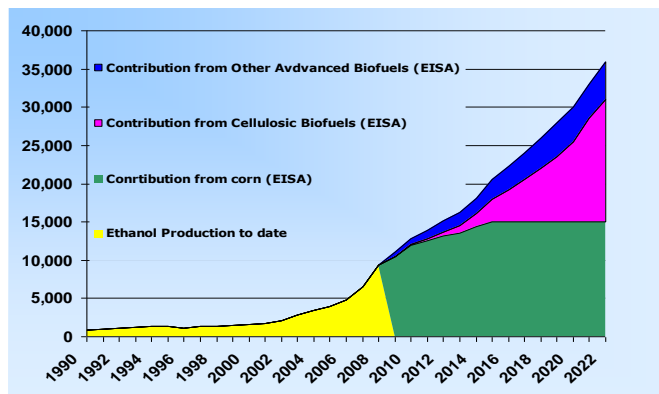
State of Technology
(yr \$2007(est.))



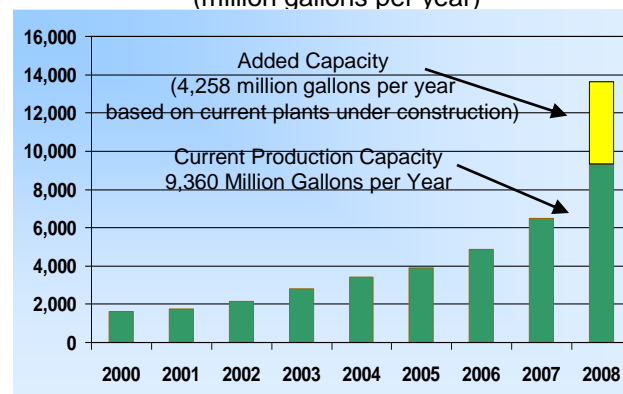
U.S. Ethanol Production Facilities
2000 - 2008



U.S. Biofuels Production and EISA Requirements
(million gallons per year)

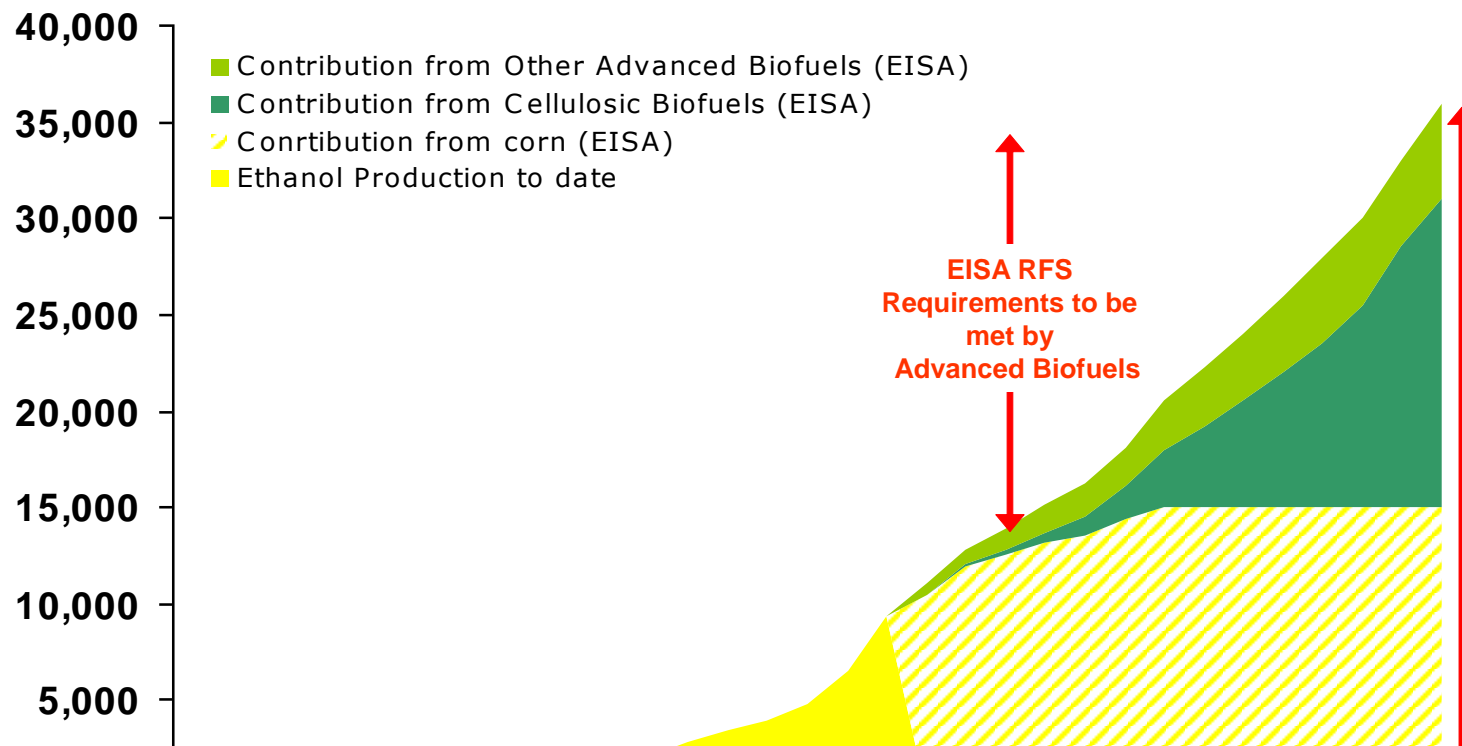


U.S. Ethanol Production Capacity
(million gallons per year)



Sources: Renewable Fuels Association, EISA, NREL

Biofuels Production, EISA Requirements and Opportunities (Million Gallons/Year)



Solicitations: Leveraging Partnerships



Commercial-Scale Biorefineries (up to \$272 million)

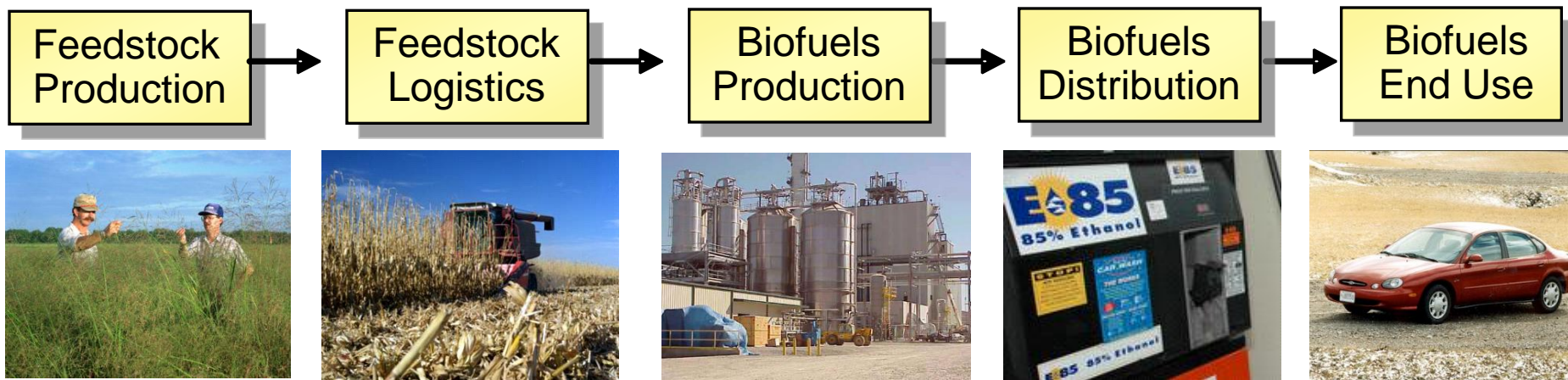
- Four cost-shared, integrated biorefinery demonstration projects to produce 130 million gallons of cellulosic ethanol in 5 years using variety of conversion technologies and cellulosic feedstocks

10%-Scale Biorefinery Validation (up to \$240 million)

- Cost-shared, integrated biorefinery demonstrations using cellulosic feedstocks to produce renewable fuels; 10% of commercial scale
- Nine selectees announced for a total investment of \$240 million

Ethanologen Solicitation (up to \$23 million)

- Five selected research teams working on microorganisms



Solicitations - continued



Enzyme Solicitation (up to \$33.8 million)

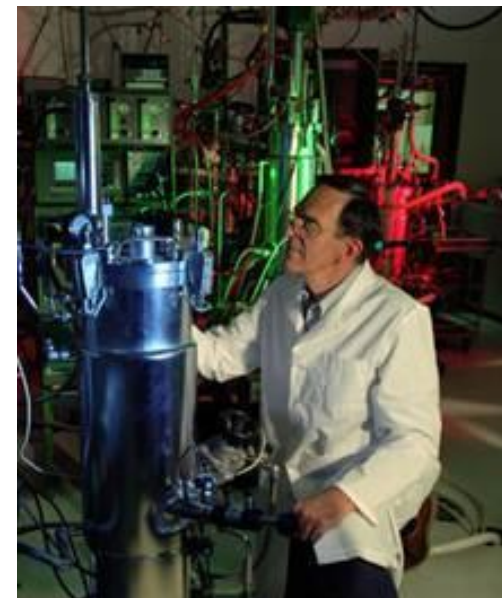
- Four selected research teams working on inexpensive enzyme systems for commercial biomass hydrolysis

Thermochemical Solicitation (up to \$16.7 million)

- Integration of gasification and catalyst development
- Pyrolysis oil stabilization

Biomass R&D Initiative Solicitation

- \$25M in USDA and DOE funding
- Three topics
 - Feedstocks Development
 - Biofuels and Biobased Products Development
 - Biofuels Development Analysis
- 20% Cost share
- Pre-applications closed March 10, 2009



Current Biomass Solicitations



• **Pilot and Demonstration of Integrated Biorefinery Operations - DE-PS36-09GO99038**

- 10% Demonstration Scale
- Biofuel as primary product
- Wide variety of biofuels and feedstocks
- \$200M in DOE funds (subject to appropriations)
- Cost share
 - 20% for pilot, 50% for demonstration
- Project Value
 - Up to \$18M each (\$DOE) for pilot scale
 - Up to \$40M each (\$DOE) for demonstration scale
- Applications due May 29, 2009

Current Biomass Solicitations



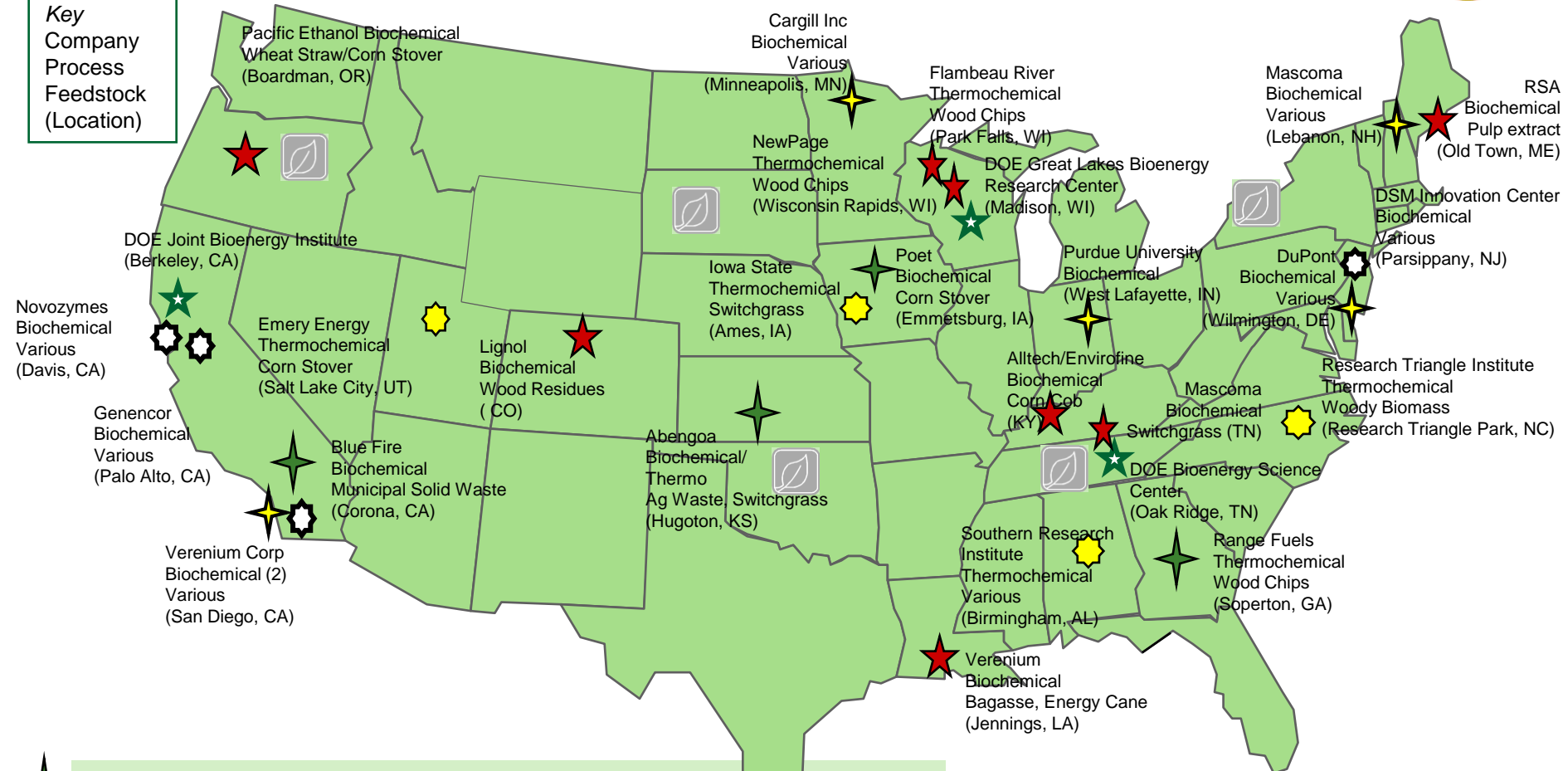
- **Development of Supply Systems to Handle and Deliver High Tonnage Biomass Feedstocks for Cellulosic Biofuels Production - DE-FOA-0000060**

- Define, design, fabricate, and demonstrate a comprehensive industrial scale feedstock logistics handling system capable of supplying high impact feedstocks to support production of domestic cellulosic biofuels.
- All aspects of harvest, collection, preprocessing, handling, transport, storage and delivery should be addressed comprehensively.
- Team must include an equipment manufacturer.
- \$15M in DOE funds (subject to appropriations)
- Cost share – 50%
- Project value – up to \$5M each (\$DOE)
- Applications due May 18, 2009

A Diversified Project Portfolio



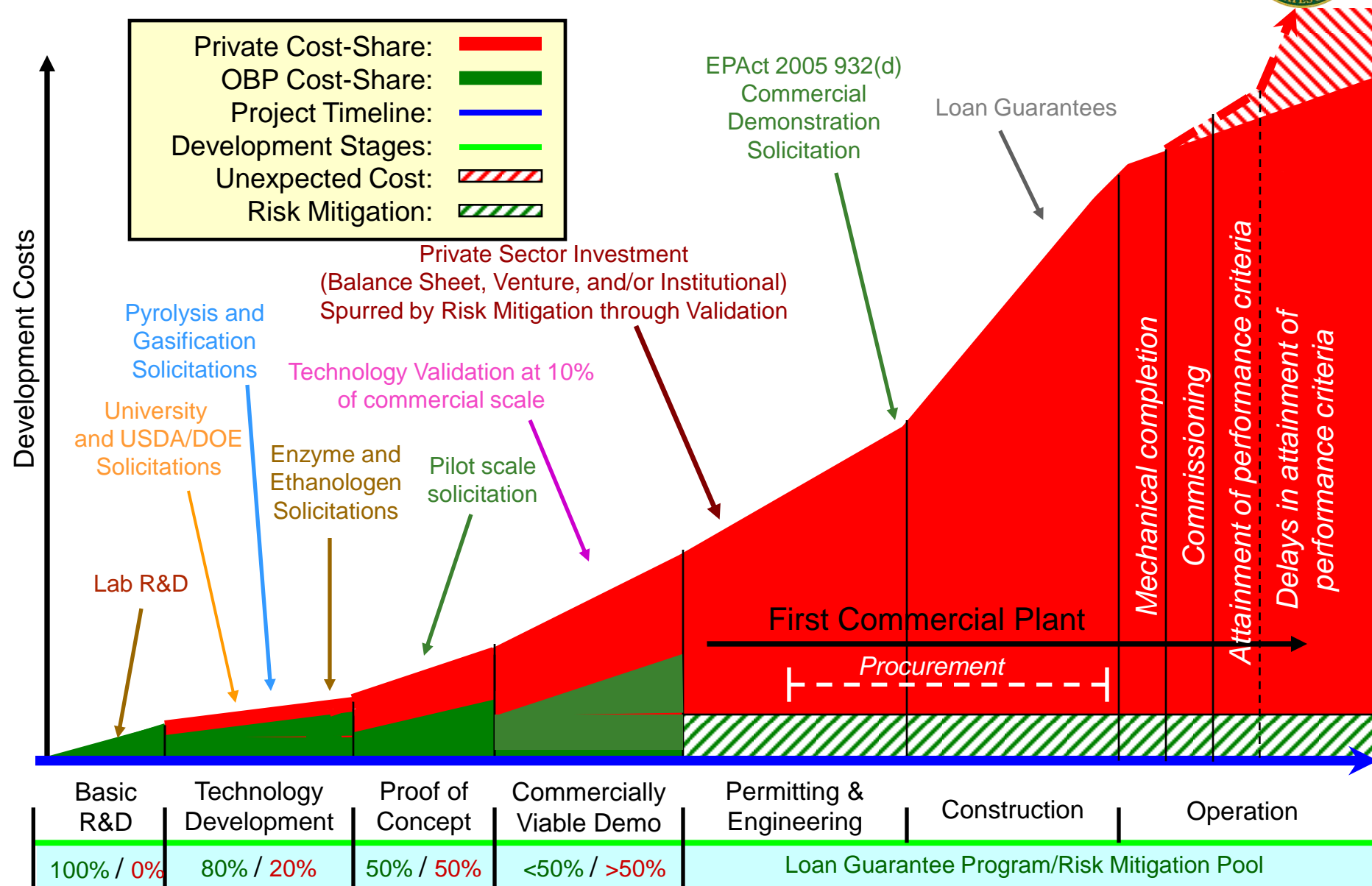
Key
Company
Process
Feedstock
(Location)



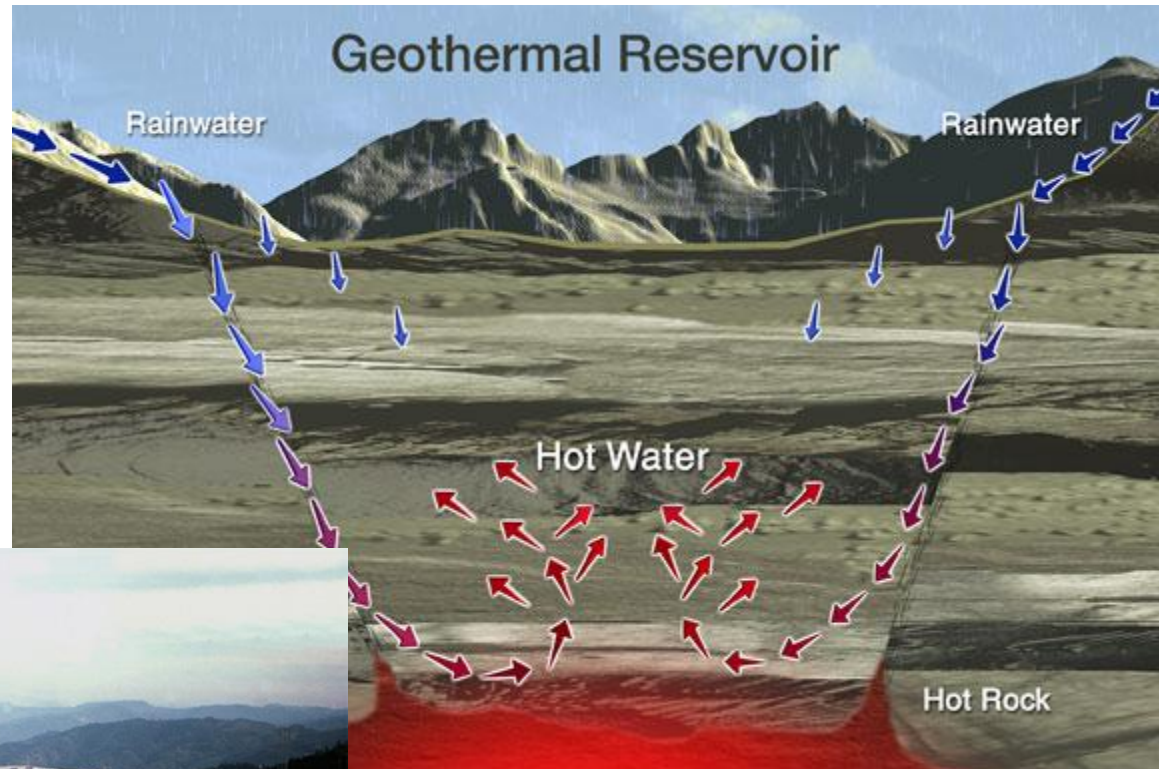
- Four Commercial-Scale Biorefinery Projects: up to \$305 million
- Nine Small-Scale (10%) Biorefinery Projects: up to \$240 million (first round)
- Three Bioenergy Centers: up to \$405 million
- Four Thermochemical Biofuels Projects: up to \$7.7 million
- Four Improved Enzyme Projects: up to \$33.8 million
- Five Projects for Advanced Ethanol Conversion Organisms: up to \$23 million

Regional Partnerships
 South Dakota State Univ., Brookings, SD
 Cornell University, Ithaca, NY
 Univ. of Tennessee, Knoxville, TN
 Oklahoma State Univ., Stillwater, OK
 Oregon State Univ., Corvallis, OR

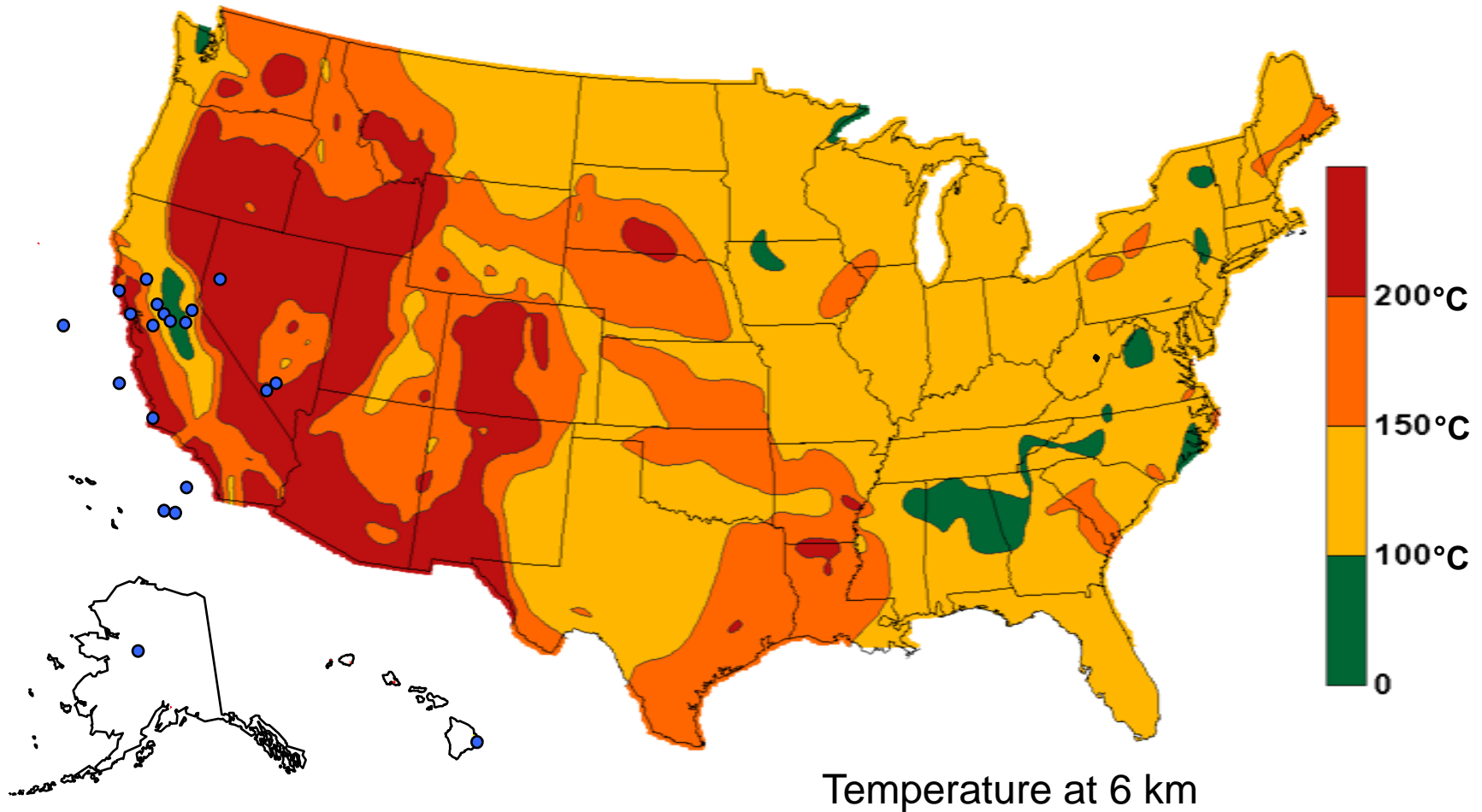
Deployment Barriers and Solutions



Geothermal Technologies Program



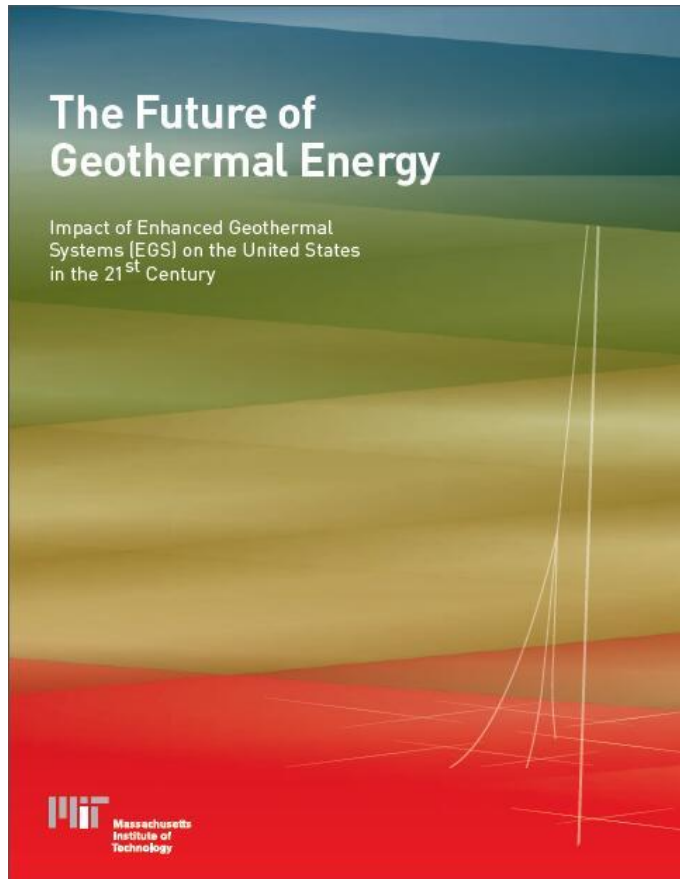
Geothermal Resources and Power plants



The Future of Geothermal Energy



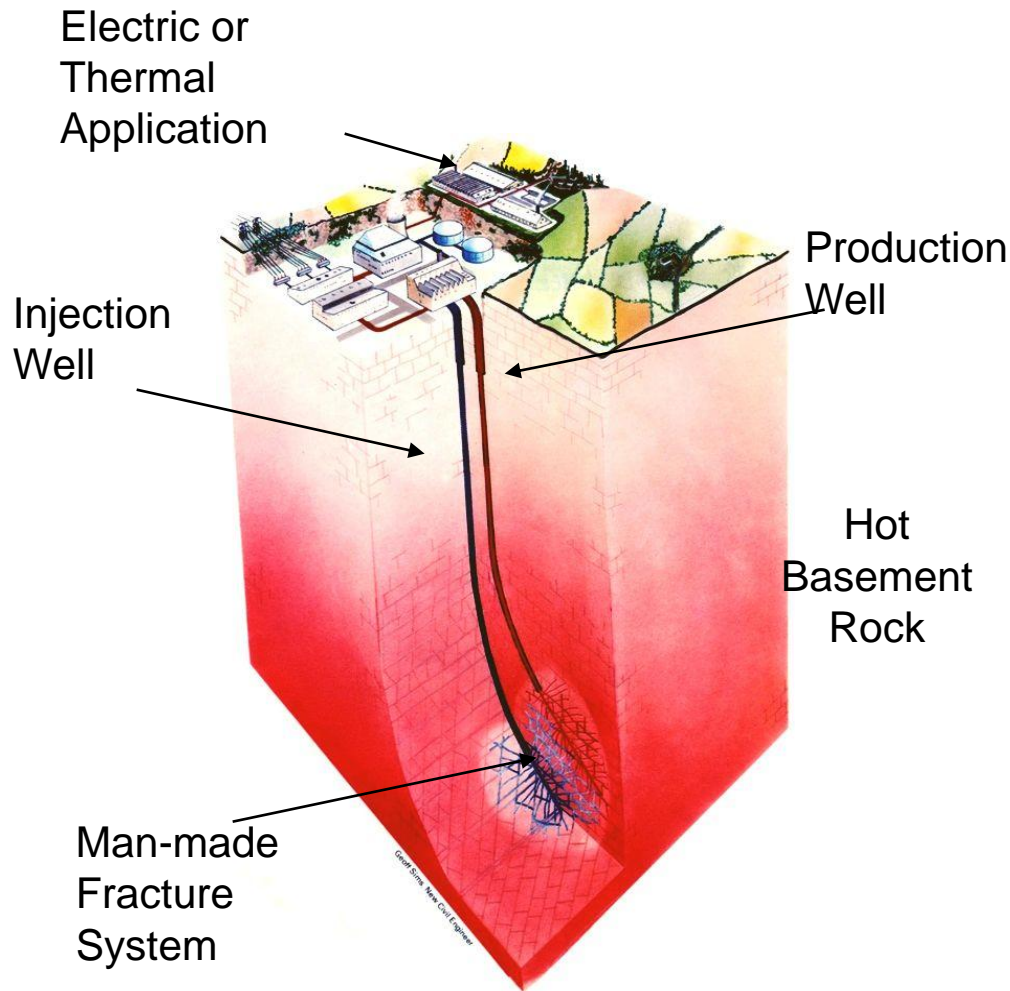
Landmark Study of Enhanced Geothermal Systems (EGS) by MIT-Led Panel of Experts



Key Findings/Recommendations

- Extractable geothermal resource exceeds 2000 times the annual energy consumption of the United States
- EGS are versatile, modular, and scalable from 1 to 50 MWe unit sizes
- Technical issues are surmountable – no showstoppers
- Cumulative EGS capacity of 100,000 MWe can be achieved in the United States within 50 years
- Public/private investment of \$800 million to \$1 billion over 15 years would produce 100,000 MWe by 2050

New Program Focus – Enhanced/Engineered Geothermal Systems (EGS)



EGS is defined as technology for engineered reservoirs that have been stimulated to extract economical amounts of heat from unproductive geothermal resources.

Geothermal Energy



- **Program Objective:** Enhanced Geothermal Systems (EGS) technology readiness by 2015
- **Technology Focus:** EGS, Hydrothermal Power, and Technology Validation
- **FY09 Budget:** \$44M



Status	FOA	Topic	Funding	Open Date	Close Date
Open	Enhanced Geothermal Systems Component Research and Development/Analysis DE-PS36-09GO99018	Develop innovative technology for cost-effective creation, management, and utilization of Enhanced Geothermal Systems	\$10M (FY2009) \$25M (FY2010 and FY2011)	3/04/2009	4/30/2009
Open	Enhanced Geothermal Systems Demonstrations DE-PS36-09GO99019	Demonstrate and validate stimulation techniques that successfully sustain fluid flow and heat extraction rates for 5-7 years that produce at least 5 MWe per year per project; or further characterize, stimulate, and validate underutilized geothermal resources	\$10M (FY2009) \$39M (FY2010-FY2014)	3/04/2009	5/14/2009

Geothermal Energy



- Enhanced Geothermal Systems (EGS) technology readiness by 2015
 - **Field Demonstrations – Fracture stimulation**
 - **Component R&D – Advanced technology to address key aspects of engineered reservoir creation, management, and utilization**
- **Industry Coupled Exploratory Drilling - Slim hole drilling to evaluate new geothermal resources**
- **Workforce Development – Curriculum and training development for a variety of geothermal applications**
- **Heat Pump Development and Demonstration**
- **Provide funds to the National Laboratories to conduct component R&D to support EGS**



NOTE: DOE anticipates issuing a FOA in April 2009 to address these topics as outlined in EISA 2007. A [Special Notice](#) has been issued.

Hydrogen Program Overview



- Objectives
 - Reduce petroleum use, greenhouse gas emissions, and air pollution and contribute to a more diverse and efficient energy infrastructure by enabling the widespread commercialization of hydrogen and fuel cell technologies.
- Metrics
 - To overcome technical barriers through RD&D of hydrogen production, delivery, and storage technologies, as well as fuel cell technologies for transportation, distributed stationary power, and portable power applications,
 - Validate and demonstrate hydrogen and fuel cell technologies in real-world conditions and
 - Educate key stakeholders whose acceptance of these technologies will determine their success in the marketplace.

Hydrogen's Current State of the Art

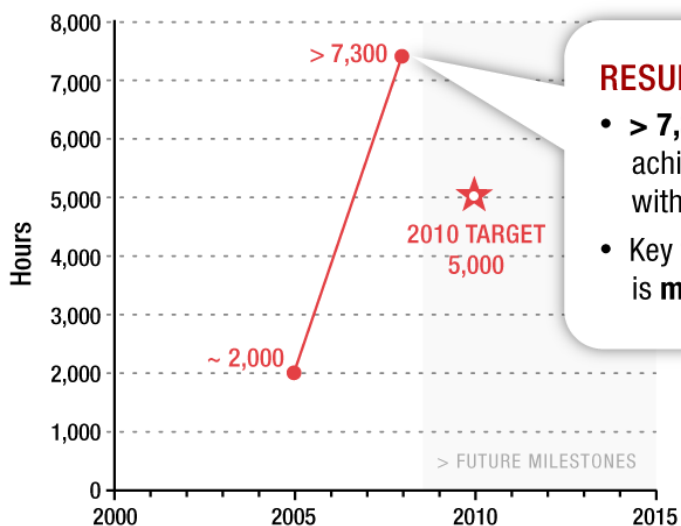


- Verified Performance of 140 Fuel Cell Vehicles and 20 Hydrogen Stations

- Over 1,000,000 total miles traveled
- 90,000 kg of Hydrogen produced
- ~60,000 miles with <10% degradation



Durability of Automotive Membrane Electrode Assembly (MEA) (in the lab)



RESULTS FROM 3M

- > 7,300-hour durability achieved for entire MEA, with voltage cycling
- Key to membrane's durability is **mechanical stabilization**

- Significant Increase in Fuel Cell (MEA) durability observed

ARRA Plans for the Hydrogen Program



- Distributed Energy:
 - Demonstration of Micro CHP Fuel Cell Systems (residential & small commercial markets)
- Market Transformation:
 - Deployment of fuel cell powered lift trucks
 - Deployment of backup power
 - Data collections and analysis
- Hydrogen production, storage & compression technologies to enable use of renewable energy resources
- Development of Novel Fuel Cell Manufacturing technologies

These are all Near-Term
Hydrogen Markets
Focused on Immediate
Job Creation

Upcoming New Awards and FOAs



- Fuel Cell FOA (closed in August 2008)
 - Approximately 50 New Awards
 - Totaling Approximately \$130M
- Hydrogen Sensor FOA
 - Released on March 9, 2009; Closes on April 30 , 2009
 - Potential of 3-4 New Awards for a Total of \$2.5M
- Annual Hydrogen Storage FOA / Lab Call
 - Planned Release Date: May 2009 *
 - Potential of 15 New Awards for Total of \$15-25M *
- Market Transformation FOA
 - Planned Release Date: FY09*
 - Potential of 15 New Awards for Total TBD*

Upcoming New Awards and FOAs - Continued



- Hydrogen Storage Materials Centers of Excellence
 - Planned Release Date: July 2009*
 - Potential of 45 New Awards for Total of ~\$90M to be Awarded in FY10*
- Research and Development of Fuel Cell System Balance-of-Plant (BOP) for Automotive and Stationary Applications
 - Planned Release Date: 2010*
 - Potential of 20 New Awards for Total of ~\$50M to be Awarded in FY11*

Total Potential of ~150
New Awards for
~\$300M in Federal
Funding In FY09/10/11
Currently Planned

*Pending Appropriations

Industrial Technologies Program



ITP is the lead federal agency responsible for improving energy efficiency in the largest energy-using sector of the country.

With our industry partners, we strive to:

- Accelerate adoption of the many energy-efficient technologies and practices available today
- Conduct vigorous technology innovation to radically improve future energy diversity, resource efficiency, and carbon mitigation
- Promote a corporate culture of energy efficiency and carbon management
- Reduce energy intensity of the industrial sector by 25% in 10 years



Energy Efficiency R&D



Deployment of Combined Heat and Power (CHP) Systems, District Energy Systems, Waste Energy Recovery Systems, and Efficient Industrial Equipment (\$156M)

Expected FOA: 5/15 – 30/09. Closing 6/30/09.

- Area of Interest 1: COMBINED HEAT AND POWER
- Area of Interest 2: DISTRICT ENERGY SYSTEMS
- Area of Interest 3: WASTE ENERGY RECOVERY
- Area of Interest 4: EFFICIENT INDUSTRIAL EQUIPMENT

Energy Efficiency R&D



Development and Deployment of Energy Efficiency Technologies for Specific Industries (\$85m):

Expected FOA: 6/15/09. Closing 8/01/09.

✧ Specific Industries

Focus Areas: Steel, Metal Casting, Chemical, Forest Products,
Aluminum, Glass, Information and Communication

✧ Cross-cutting

Focus Areas: Materials, Energy Intensive Processes (EIP)



Technology Delivery: *Save Energy Now* Energy Assessments

All Industries

- 3-day assessments focusing on a single energy system in largest U.S. plants
- 757 assessments completed since 2006
- 645 assessments with completed reports
- **Average plant found ways to reduce energy bill by about 8%**
- Nearly 40% of recommendations implemented or in process
- Identified energy cost savings:
\$1,016 million
- Total potential carbon dioxide emissions reduction:
8.6 million metric tons



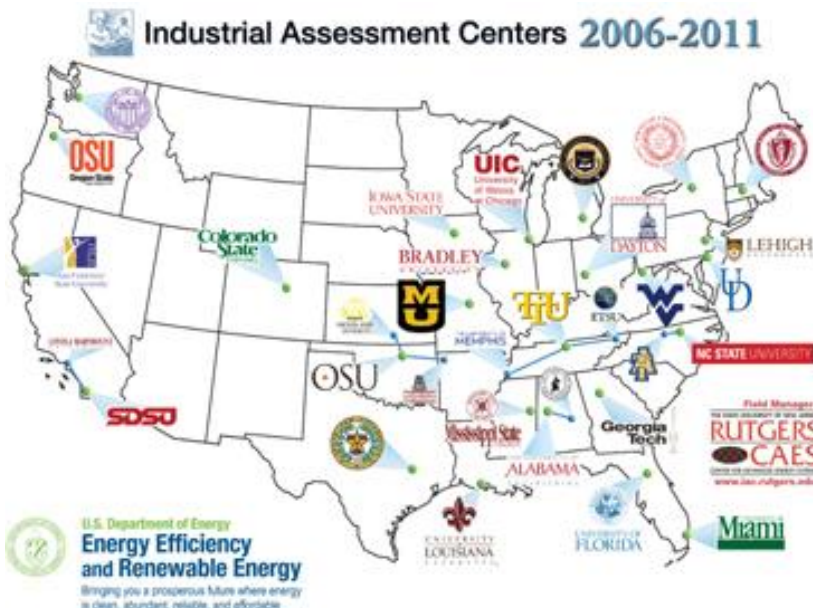
"*Save Energy Now* has helped us find creative ways to save energy and reduce carbon emissions in our manufacturing processes -- all while delivering the same great products our consumers love."

-- Dick Frohmader,
Program Manager for Global
Energy, Kraft Foods

Technology Delivery: Industrial Assessment Centers



- DOE's 26 university-based Industrial Assessment Centers (IACs) train engineering students for careers in industrial energy efficiency
- IACs serve 300 plants per year (under .3 TBtu/yr) and typically identify savings of over \$147,000/plant with average implemented savings of over \$71,000/plant
- Database of over 14,000 assessment results: <http://iac.rutgers.edu/database>



Technology Delivery: Training



- System-wide training
- Component-specific training
 - Compressed Air Systems
 - Fan Systems
 - Motor Systems
 - Process Heating
 - Pumping Systems
 - Steam Systems
- Qualified Specialist
 - Three day training with qualification exam – Expert in DOE system area tool
- Corporate Energy Management Program



http://www1.eere.energy.gov/industry/bestpractices/professional_development.html

ITP - Strong Partnerships



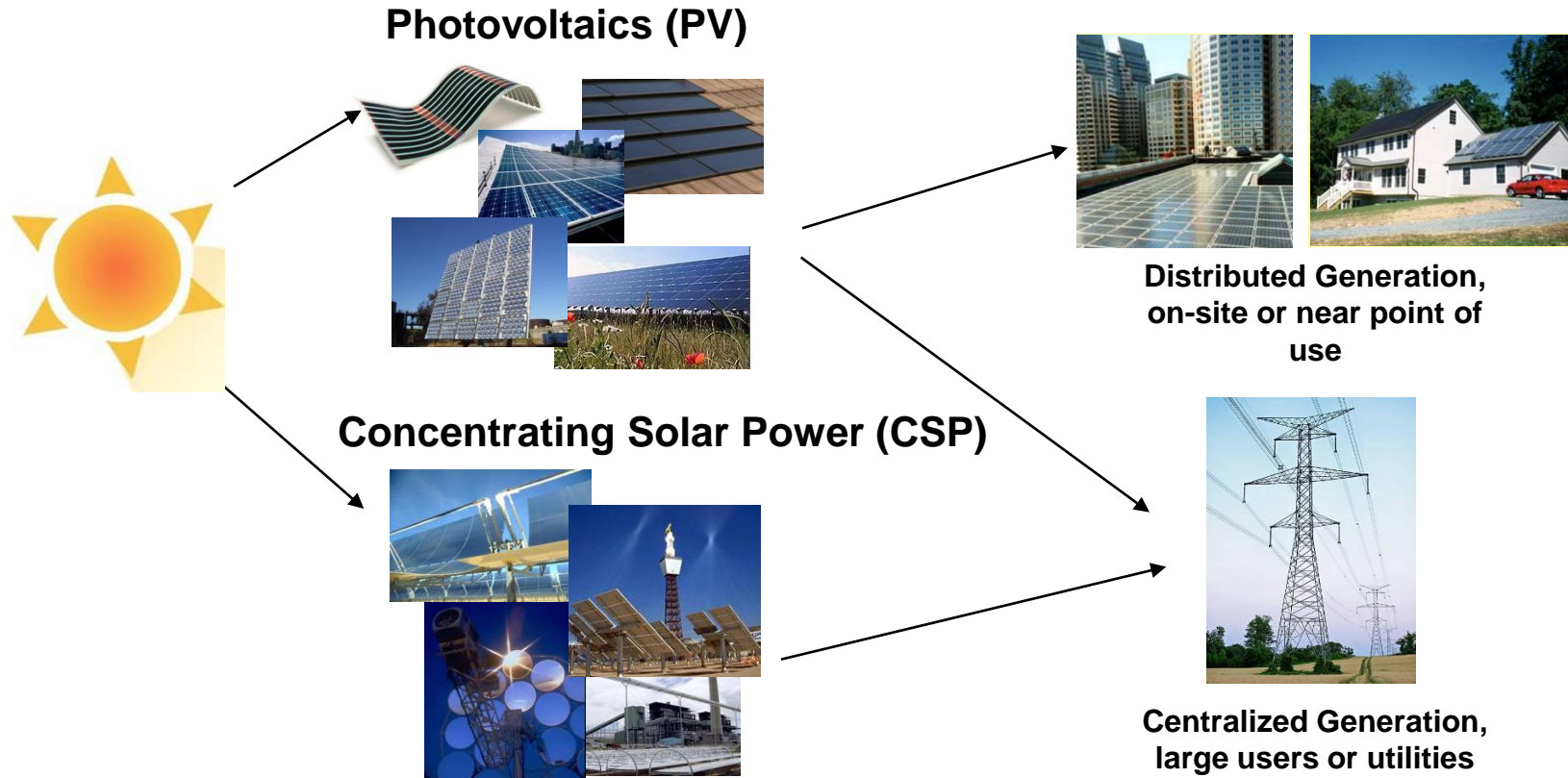
ITP maximizes its impact through diverse partnerships:

- State energy offices (23 states receiving funding in FY09)
- Utilities
- Nearly 600 industry partners in 2008
 - Energy-intensive industries -- chemicals, petroleum, forest products, and metals
 - Major value-adding industries -- food processing, automotive, and fabricated metals
 - High-growth industries -- computers and electronics
 - New energy supply industries -- ethanol production and bio-refining
- Other federal government agencies
 - DOC (particularly NIST)
 - EPA (ENERGY STAR for Industry)
- Trade associations
- Supply chain partners
- Interagency groups, NGOs, and other industry groups, such as USCAR



Solar Technologies Program

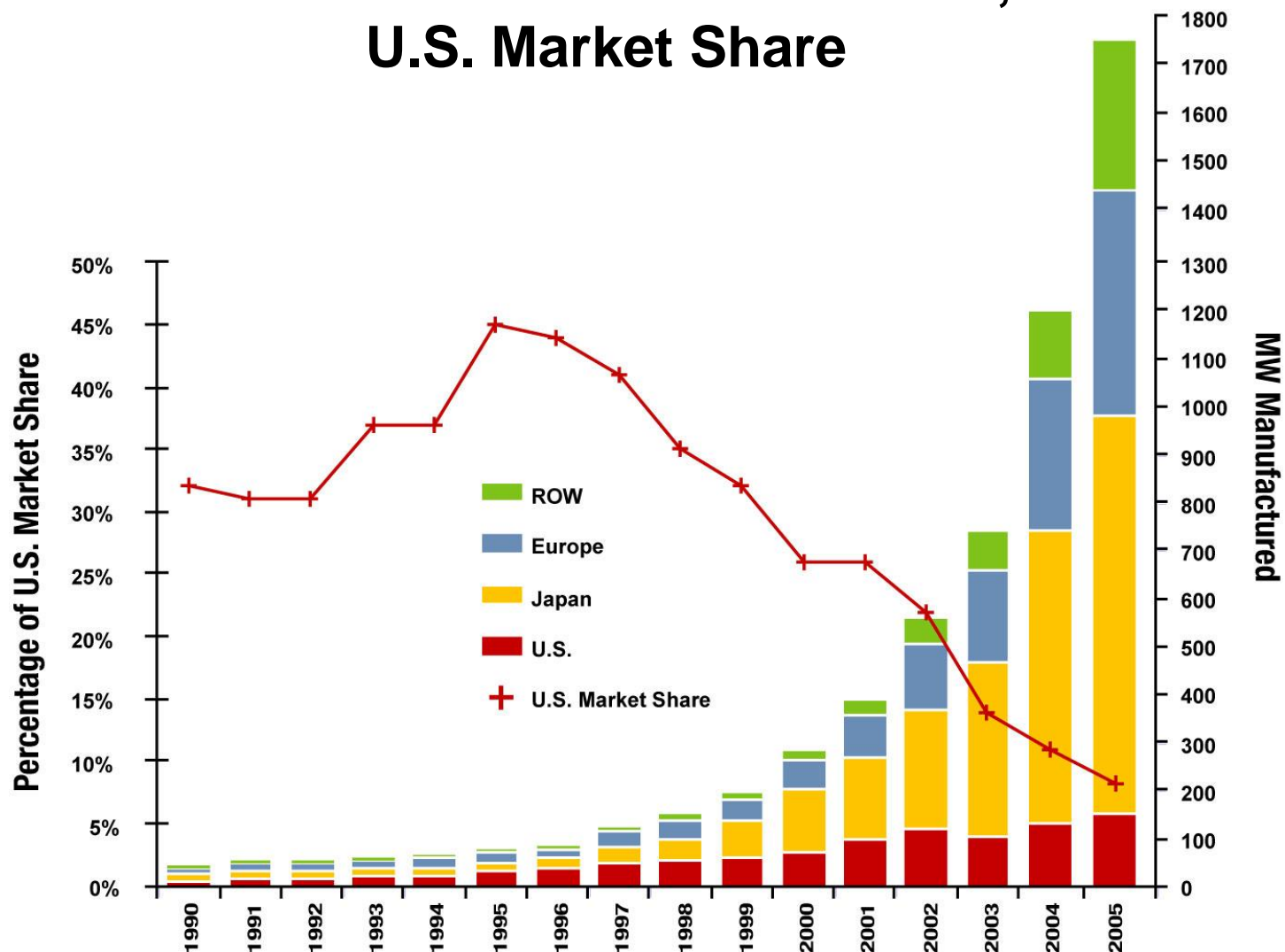
- Focus on achieving price-parity and scale for solar electricity generation from *both* PV *and* CSP



PV program will target >30% market share for annual new capacity additions, CSP program will target baseload price/dispatchability and GW-scale.

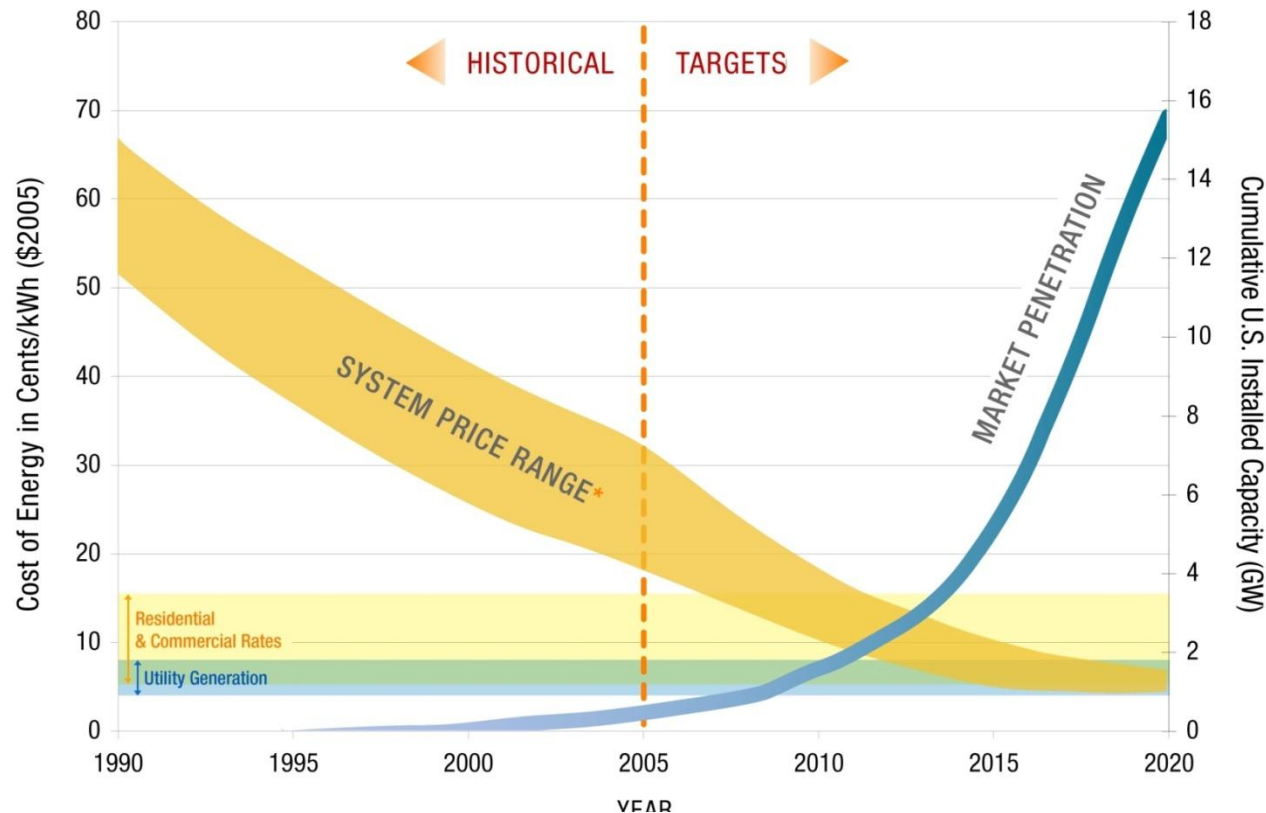


Global PV Production Growth, U.S. Market Share



U.S. production now lags Japan and Germany, and China passed U.S. in 2006.

The Solar Energy Technology Program's goal is to make PV solar cost-competitive by 2015



Market Sector	Current U.S. Market Price Range (¢/kWh)	Cost (¢/kWh) Benchmark 2005	Cost (¢/kWh) Target 2010	Cost (¢/kWh) Target 2015
Residential	5.8-16.7	23-32	13-18	8-10
Commercial	5.4-15.0	16-22	9-12	6-8
Utility	4.0-7.6	13-22	10-15	5-7

Concentrating Solar Power (CSP)

- Aiming for >1GW installations and baseload power



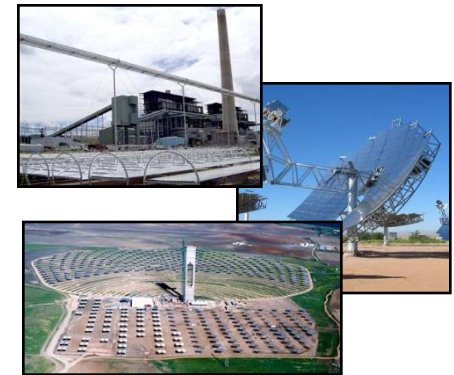
Troughs

- Optimize receiver and concentrator designs
- Develop next-generation collector designs and supply chain
- Scale-up plant size and increase operating temperatures



Advanced Concepts (CLFR, Towers, Dish-Stirling)

- Test new CLFR concepts in a power plant configuration
- Demonstrate new tower plant designs to evaluate costs
- Address Dish manufacturability and Stirling engine reliability issues

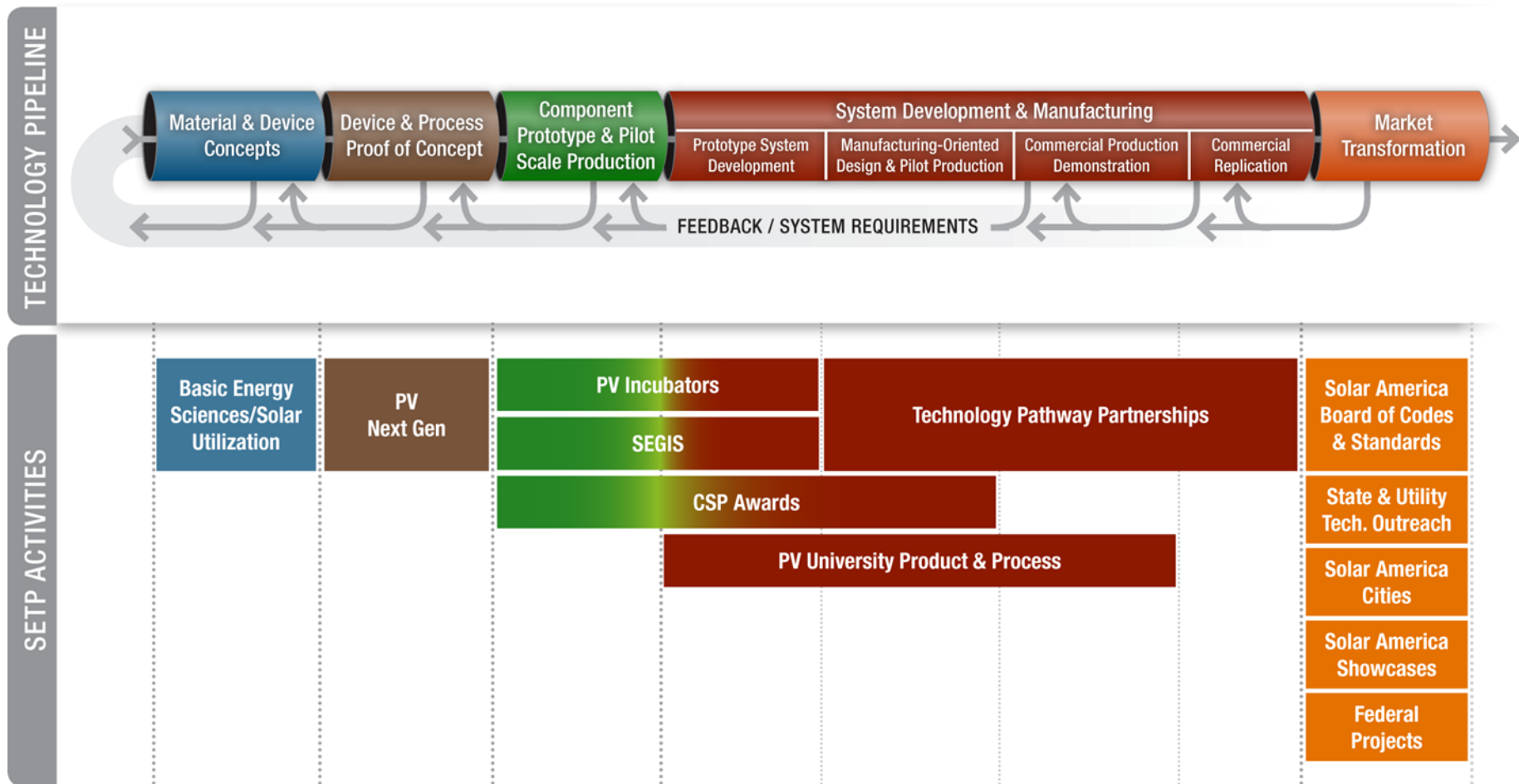


Storage

- Develop advanced heat transfer fluids for more efficient operation at high temperatures with molten salt
- Test innovative designs for low-cost storage options, including thermocline tanks and new fluids for fields



Solar Energy Technology RDD&D Pipeline



Solar Energy Technology – Current and Planned Funding Opportunities – Market Transformation



Title	Scope	Release Date	Estimated Funding
Installer Workforce Development	Train the trainer for PV and solar hot water installations	April 2009	TBD
Solar America Showcases	Technical assistance to solar installations	Open	Technical Assistance Only (no \$\$)
Solar Outreach to Local Governments (SOLGov)	Outreach coordination targeted at local governments	April 2009	TBD
Solar America Showcases – Special Topics	Technical assistance to solar installations for utilities and municipalities	April 2009	Technical Assistance Only (no \$\$)
Solar Policy and Analysis Regional Centers	University-based centers to gather, analyze, and share information that benefits the regional solar market	Request for Information – Open (responses due May 7)	TBD

Solar Energy Technology – Current and Planned Funding Opportunities - Photovoltaics



Title	Scope	Release Date	Estimated Funding
Minority University Research Associates	Undergraduate research	April 2009	\$1.5 M
PV Incubator (through NREL)	Transition pre-commercial technologies to full-scale manufacturing	April 2009	\$10 M

Solar Energy Technology – Current and Planned Funding Opportunities – Systems Integration



Title	Scope	Release Date	Estimated Funding
High-Penetration PV	Grid integration issues and mitigation strategies for high-penetration levels of PV	April 2009	\$25 M
Solar Energy Grid Integration Systems – Energy Storage	Energy storage to support PV grid integration	Planning Workshop – Summer 2009	TBD

Solar Energy Technology – Current and Planned Funding Opportunities – Concentrating Solar Power



Title	Scope	Release Date	Estimated Funding
Concentrating Solar Power for Baseload Power Generation	Demonstration of baseload concepts for CSP	May 2009	\$50 M

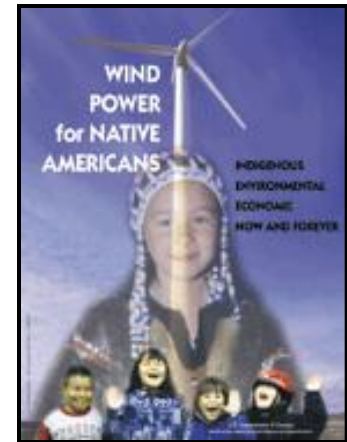
Tribal Energy Program



Offering financial and technical assistance to Tribes through government-to-government partnerships: and providing education and training.

www.eere.energy.gov/tribal

Tribal Energy Activities: \$6M



Status	FOA	Topic	Funding	Open Date	Close Date
Open	Renewable Energy and Energy Efficiency Deployment in Indian Country	To develop or construction renewable energy projects or implement energy efficiency improvements in Indian Country.	\$3M	1/30/2009	4/30/2009
Open	First steps toward tribal weatherization-human capacity development	For weatherization of tribal housing	\$1M	3/16/09	5/7/09
Open	Assessing the Feasibility of Renewable Energy Development	To conduct feasibility studies for building efficiency or RE development	\$2M	3/13/09	4/16/09

Transportation Electrification



- Funding Opportunity Announcement (FOA) Released March 19, 2009
 - President Obama announced the FOA March 19
 - Total Funding: \$378M
- Proposals are due May 13
- Four Areas of Interest (AOI):
 - Electric Drive Vehicle Demonstration and Evaluation
 - Transportation Sector Electrification
 - Combined Proposals for AOI 1 and AOI 2
 - Advanced Electric Drive Vehicle Education Program
- Awards will be made by 09/30/2009

Vehicle Technologies Energy Storage and Power Electronics and Electric Machines



- Funding Opportunity Announcement (FOA) Released March 19, 2009
 - President Obama announced the FOA March 19
 - Total Funding: \$2.0BM
- Proposals are due May 19
- Seven Areas of Interest (AOI):
 - Advanced Battery Supplier Manufacturing Facilities
 - Combined Applications for Areas of Interest 1 and 2
 - Advanced Lithium ion Battery Recycling Facilities
 - Electric Drive Component Manufacturing Facilities
 - Electric Drive Subcomponent Manufacturing Facilities
 - Combined Applications for Areas of Interest 5 and 6
- Awards will be made by 09/30/2009

Water Power Program

- FY09 Budget \$40M

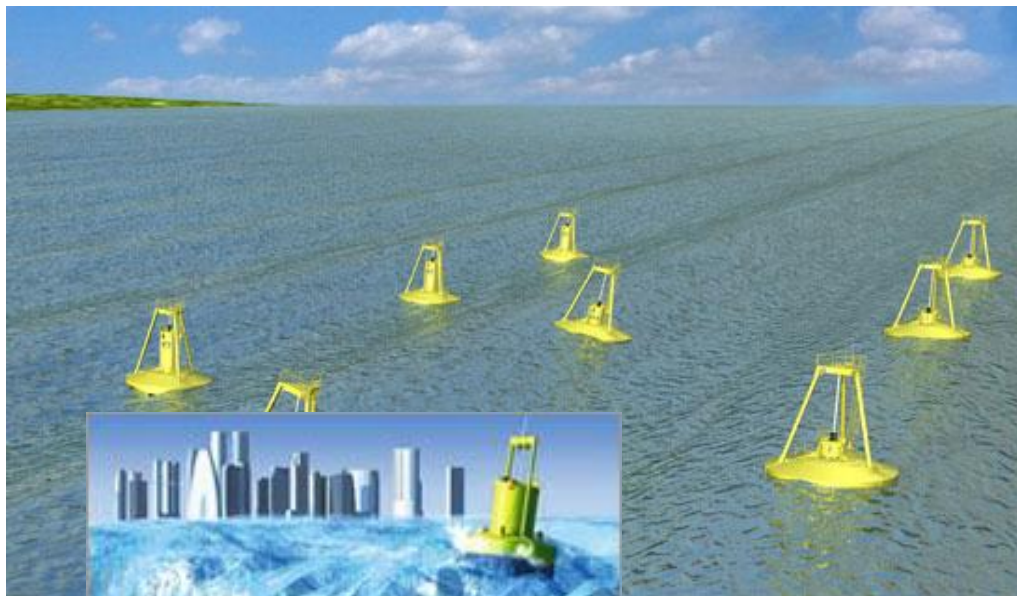
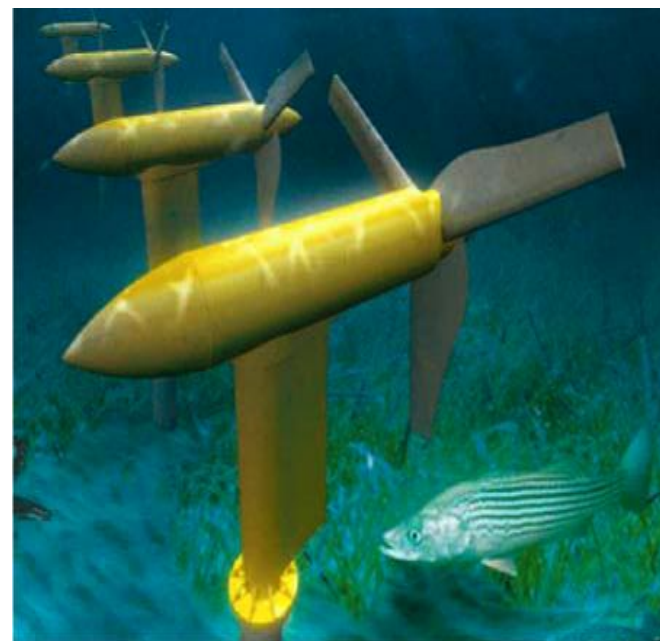


ILLUSTRATION: BRYAN CHRISTIE



Water and Hydropower Technologies



- **Objective:** Investigate emerging water power technologies and further improve conventional hydropower systems
 - 80,000 MW installed in U.S.; 10% of U.S. electricity
 - Hydropower accounts for than 75% of the nation's renewable energy
- **Focus:** Capture energy from waves, tides, ocean currents through R&D of marine and hydrokinetic devices

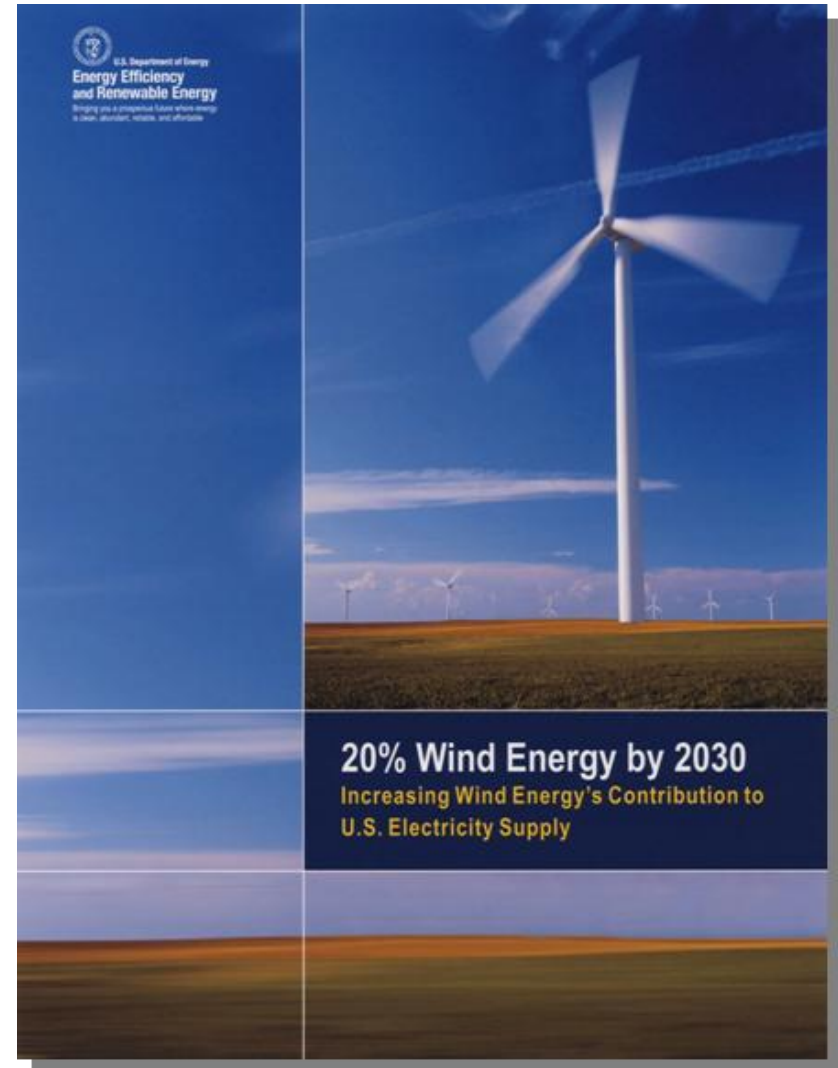


Status	FOA	Topic	Funding	Open Date	Close Date
Open	Advanced Water Power	Marine and Hydrokinetic Energy Conversion Device and component Design, Development, Environmental studies and market acceleration	\$17 Million	4/3/09	6/3/09
Open	Advanced Water Power	Supporting Research in Testing for Hydrokinetic, Hydropower and environmental mitigation and assessment	\$45 Million	4/3/09	6/3/09

Wind Energy



- **20% Wind Report – Guidelines for overcoming obstacles**
 - Explores the feasibility of one scenario for supplying 20% of the nation's electricity from wind by 2030
 - Not a prediction or policy recommendation
 - The work of more than 100 individuals involved from 2006-08 (govt., industry, utilities, NGOs)
 - Transmission and Integration
 - Performance and Reliability Collaborative
 - Cost of Energy Analysis
 - Advanced Manufacturing
 - Workforce Development
 - Siting Studies



FY09 Wind Budget \$55M



6% Low Wind Speed Technology

- Utility Scale Wind Farms
- Turbine Productivity and
- Reliability Enhancements

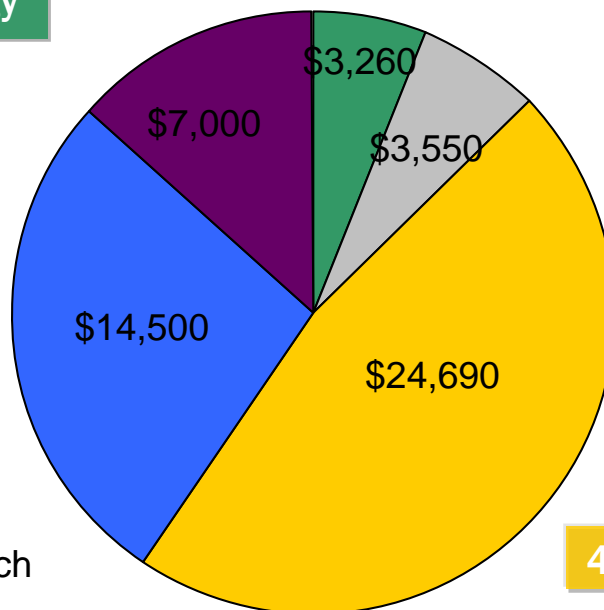
13% Technology Acceptance

- Wind Powering America
- Wind Siting & Environmental Analysis
- Market Development and Outreach

27% Systems Integration



- Wind Forecasting
- Transmission
- Grid Analysis, Interconnection, and Operation



7% Distributed Wind Technology

- Small to medium scale systems
- Improved reliability & performance
- Community-Based Wind Power



47% Supporting Research & Testing

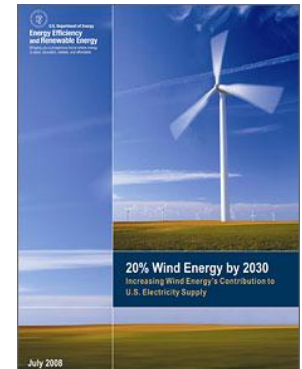
- Manufacturing and Supply Chain
- Reliability and Performance
- Component Testing Facilities



Wind Power



- **Program Objective:** Wind to generate 20% of electricity demand by 2030
 - 3 million MW of land-based resource potential
 - Over 18,000 MW installed in U.S; ~1% of current U.S. energy production
- **Program Activities:** Facilitate installations, reduce electricity and system costs, address interconnection and grid impacts, and increase distributed wind deployment



Status	FOA	Topic	Funding	Open Date	Close Date
Closed	20% Wind by 2030: Overcoming the Challenges (Lab Call) DE-PS36-09GO99010	3 Topic Areas: 1) turbine research, development and testing; 2) environmental research and siting strategies; and 3) workforce development <i>Open to: National Laboratories</i>	\$3M	12/30/08	3/3/2009
Closed	20% Wind by 2030: Overcoming the Challenges (Industry Call) DE-PS36-09GO99009	6 Topic Areas: 1) Supporting Wind Turbine Research and Testing; 2) Market Acceptance; 3) Environmental Impact; 4) Transmission Analysis, Planning and Assessments; 5) Workforce Development; and 6) Distributed Wind Technology	\$8M	12/30/08	3/5/2009

Goal: Wind to provide 20% of U.S. electricity production by 2030, a 20-fold increase in current production.

EERE Commercialization and Deployment Activities



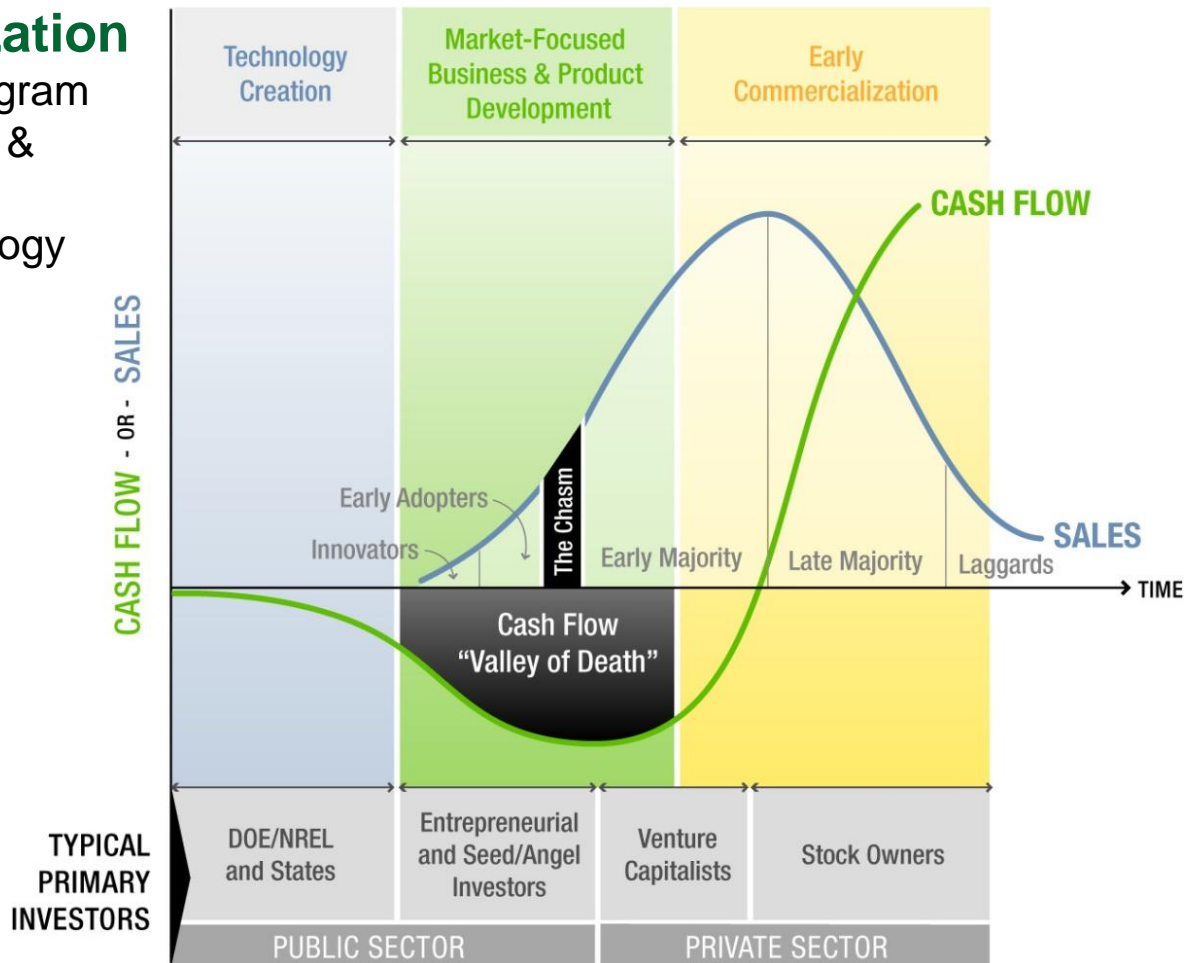
Focus on accelerating the deployment the most promising energy technologies into the commercial marketplace

Technology Commercialization

- Entrepreneur in Residence program
- Technology Commercialization & Deployment Fund
- EERE Venture Capital Technology Showcase

Deployment

- State Energy Program
- Hawaii Clean Energy Initiative
- DOE TEAM Initiative
- National Parks Deployment Partnership
- Freedom Prize
- Large-Scale Weatherization

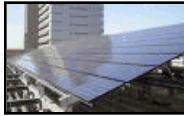





Other DOE Recovery Act Programs



- **\$4.5 Billion for Electricity Delivery and Energy Reliability RDD&D Partnerships**
 - Projects to modernize the nation's electricity delivery systems through competitive, cost sharing, partnership arrangements
 - Distributed energy
 - energy storage to help balance electricity output with demand
 - smart grid technologies
- **\$3.4 Billion for Fossil Energy RDD&D Partnerships**
 - \$800 million for the Clean Coal
 - \$1.52 billion for carbon capture
 - \$50 million for site characterization activities in geologic formations;
 - \$20 million for geologic carbon sequestration training and research

\$22B energy-related tax incentives and revisions

CleanTech segment	Program	Total allocation ¹ \$ Billions	Allocation
 Renewables / cleaner energy \$17.3 billion	Expanded Renewable Energy Production Credit	13.1	Utilities
	Investment tax credits for cleantech manufacturing	1.6	Manufacturers
	Remove dollar cap on small-scale energy property	0.9	Homeowners, businesses
	Additional clean renewable energy bonds	0.6	State/local gov't
	Tax credit for investment in nonsolar renewables	0.3	Utilities, gov't
	Grants in lieu of credits for renewable energy facilities	0.8	Utilities
 Energy efficiency / building retrofits \$2.8 billion	Tax credits for EE home improvement	2.0	Utilities
	Bonds for government energy conservation programs	0.8	Homeowners
 Fuel efficient / electric vehicles \$2.1 billion	Minimum \$2,500 plug-in electric vehicle credit	2.0	Individuals, business
	Tax credit for alternative refueling property	0.1	Individuals, business
 Mass transit \$0.5 billion	Tax-exemption for high-speed rail facilities	0.3	States, transit agencies
	Increase maximum tax-free transit compensation	0.2	Individuals
		Total: \$21.9 billion	

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Federal Tax Incentives



- **Extension of Renewable Energy Production Tax Credit for 3 years**
 - 2.1 cents per kilowatt-hour for **wind**, closed-loop biomass, geothermal, and solar -- 1 cent per kilowatt-hour for open-loop biomass, municipal solid-waste, and qualified hydropower.
- **Expansion of Investment Tax Credit**
 - The investment tax credit is a one-time, up-front tax credit equal to 30% of the cost of the facility. Had been available for **solar & small wind**.
 - Those firms qualifying for the PTC will now have the option to take the ITC instead.



- **Advanced Energy Manufacturing Tax Credit**
 - The Act establishes a 30% tax credit for investment in projects that re-equip, expand, or establish manufacturing facilities that produce renewable energy and related activities
 - \$2.3 billion for these manufacturing credits to be allocated by the Treasury in a competitive bidding process.
- **Election of Renewable Energy Investment Grants**
 - Firms may elect to receive direct grants in lieu of the PTC or ITC, which will benefit firms that may not have otherwise had sufficient tax liabilities to take advantage of the credits.

DOE Loan Guarantee Program



Program Objectives

Issue loan guarantees to eligible projects that:

- ✧ Avoid, reduce or sequester anthropogenic emissions of greenhouse gases or air pollutants
- Employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued
- Can be deployed commercially
 - Beyond the research and development, pilot and demonstration stages
- Provide a reasonable prospect for repayment



DOE Loan Guarantee Program



Historical Timeline

August 2005	Energy Policy Act of 2005 is enacted, including Title XVII: Incentives for Innovative Technologies , providing the basis of the Loan Guarantee Program
August 2006	First solicitation issued inviting interested parties to submit pre-applications that meet the Title XVII statutory requirements
February 2007	Congress provides DOE with up to \$4.0 billion in loan guarantee authority
October 2007	DOE issues Final Regulations for Loan Guarantee Program
October 2007	Sixteen pre-applicants from August 2006 solicitation invited to submit full application
December 2007	Congress provides \$38.5 billion in additional loan guarantee authority expiring September 30, 2009
June 2008	Second solicitation issued for projects valued up to \$10 billion. Closed February 26, 2009

DOE Loan Guarantee Program



Types of Projects Eligible for a Federal Loan Guarantee

Title XVII identifies ten discrete categories of projects that are eligible for a loan guarantee, including:

1. Renewable energy systems
2. Advanced fossil energy technology, including coal gasification meeting certain statutory requirements
3. Hydrogen fuel cell technology for residential, industrial, or transportation applications
4. Advanced nuclear energy facilities
5. Carbon capture and sequestration practices and technologies, including agricultural and forestry practices that store and sequester carbon
6. Efficient electrical generation, transmission, and distribution technologies
7. Efficient end-use energy technologies
8. Production facilities for fuel efficient vehicles, including hybrid and advanced diesel vehicles
9. Pollution control equipment
10. Refineries, meaning facilities at which crude oil is refined into gasoline.

DOE Loan Guarantee Program



Legislation and Final Rule

Title XVII and the final regulations identify the financial parameters for each project application

- The Secretary must determine that there is a “reasonable prospect” of repayment before a loan guarantee is issued
- A guarantee shall not exceed 80 percent of total project costs
- In the event of default, the Secretary will have a superior lien on all project assets, pledged as collateral
- The Secretary must charge and collect fees sufficient to cover applicable administrative expenses
- The borrower will pay at the time of closing a “credit subsidy” for the cost associated with a default on its obligation
- Applicants may apply for a 100% guarantee of the debt instrument from DOE funded by the Federal Financing Bank (FFB).
- Guarantees for less than 100% of the loan amount must be funded by an eligible lender other than the FFB (e.g., a private lender)
- The guaranteed portion of a loan may be “stripped” from the non-guaranteed portion, except in cases where the guarantee exceeds 90% of the loan amount

Loan Guarantee Program – Recovery Act



- **\$6 Billion in Energy Loan Guarantee Partnerships**

- Innovative Technology Loan Guarantee Program is extended to support an additional \$60 – 80 billion in new loans,
 - Projects must commence construction before September 30, 2011
- Up to **\$500 million** of this amount is allocated to innovative biofuels technologies that are capable of deployment on a commercial scale
 - Must begin construction by September 30, 2011
 - Pilot scale & Demonstration Scale are eligible
 - Must meet Davis/Bacon Requirements for Construction

Grants and Contracts



- **Contract**
 - Acquiring (by purchase, lease, or barter) property or services for the direct benefit or use of the United States Government
- **Grant**
 - To carry out a **public purpose** of support or stimulation authorized by a law of the United States
- **Cooperative Agreement**
 - When an awarding agency expects to be **substantially involved** in a project (beyond routine monitoring and technical assistance)

How Can I Apply?



- Entities that meet the eligibility criteria for grants from the U.S. Department of Energy (DOE) should become familiar with FedConnect (the mechanism to apply for grants) by downloading and reading:
- https://www.fedconnect.net/FedConnect/PublicPages/FedConnect_Ready_Set_Go.pdf
- Step 1: Request a DUNS Number at <http://fedgov.dnb.com/webform/displayHomePage.do>
- Step 2: Register with the Central Contractor Registry (CCR) at <http://www.ccr.gov/>.
- Step 3: E-Business Point of Contact must register in FedConnect at <https://www.fedconnect.net/FedConnect/>.
- Please allow 21 days to complete the registration process.
- Step 4: After registration, eligible entities are ready to apply for grants through FedConnect.

Grant - Resources



- 10 CFR 600
- DOE Guide to Financial Assistance
- Merit Review Guide
- OMB Circulars
- Found at:
http://management.energy.gov/policy_guidance/financial_assistance.htm

EERE Points of Contact



- General Information - EERE Information Center at <http://www1.eere.energy.gov/informationcenter/> or 1-877-EERE-INF
• (1-877-337-3463)
- Biomass and Biorefinery Systems – Shab Fardanesh, 202-586-7011, shabnam.fardanesh@ee.doe.gov
- Building Technologies – Bryan Berringer, 202-586-0371, bryan.berringer@ee.doe.gov
- Facilities and Infrastructure – Greg Collette, #303-275-4734, greg.collette@go.doe.gov
- Federal Energy Management Program – Brad Gustafson, 202-586-5865, brad.gustafson@ee.doe.gov
- Geothermal Technology – Lauren Boyd, 202-287-1854, lauren.boyd@ee.doe.gov
- Hydrogen Technology – Sara Dillich, 202-586-7925, sara.dillich@ee.doe.gov

EERE Points of Contact - continued



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- Industrial Technologies – Jim Quinn, 202-586-5725, james.quinn@ee.doe.gov
- Solar Energy – Tom Kimbis, 202-586-7055, tom.kimbis@hq.doe.gov
- Vehicle Technologies – William Key, 202-586-3157, william.key@ee.doe.gov
- Weatherization and Intergovernmental Activities --
 - Ronald Shaw, 202-586-6593, ronald.shaw@hq.doe.gov (for Weatherization)
 - Mark Bailey, 202-586-9424, mark.bailey@hq.doe.gov (Block Grants, State Energy Programs, and Appliance Rebates)
- Wind Energy – Jim Ahlgrimm, 202-586-9806, jim.ahlgrimm@ee.doe.gov
- EERE Backup (If the team has questions, any contact is unreachable, or the answer is unresponsive) Michael York, 202-586-5669, michael.york@ee.doe.gov



Questions??

Thank you!